

# Spherical Plain Bearings & Rod Ends

Spherical plain bearings are ready-to-fit, standardised machine elements. The concave outer ring bore and the convex inner ring geometry allow spatial adjustment motion. The bearings can support static loads and are suitable for tilting and swivel motion. They can compensate for shaft misalignment, are not subject to edge stresses under misalignment and allow substantial manufacturing tolerances in the adjacent construction.

Rod ends are spherical plain bearing units. They comprise a rod type housing, into which a spherical plain bearing is integrated, and have either a female thread in the body or a male thread on the body. Rod ends are used as connecting levers and connecting rods and as connecting elements between cylinders and their adjacent parts in hydraulic and pneumatic cylinders. They can be easily assembled onto machines.



# Internal clearance

## Radial internal clearance

Radial internal clearance of radial spherical plain bearings requiring maintenance with steel/steel sliding contact surface. The radial internal clearance is defined as the distance by which the inner ring can be moved in a radial direction relative to the outer ring from one extreme position to the other.

The radial internal clearance is divided into three groups(Table 1) and is given in the dimension tables. This assumes that the bearing is mounted in a housing bore that, apart from the correction of geometrical inaccuracies, causes no dimensional changes in the bearing.

Table 1: Radial internal clearance groups:

Series		Radial internal clearance in $\mu\text{m}$					
GE..DO GE..DO-2RS GE..HO-2RS GE..LO Bore d	GE..FO GE..FO-2RS	C2 smaller than normal		CN normal		C3 larger than normal	
mm	mm	min	max	min	max	min	max
6	6	8	32	32	68	68	104
8	8	8	32	32	68	68	104
10	10	8	32	32	68	68	104
12	–	8	32	32	68	68	104
–	12	10	40	40	82	82	124
15	15	10	40	40	82	82	124
16	–	10	40	40	82	82	124
17	17	10	40	40	82	82	124
20	–	10	40	40	82	82	124
–	20	12	50	50	100	100	150
25	25	12	50	50	100	100	150
30	30	12	50	50	100	100	150
32	–	12	50	50	100	100	150
35	–	12	50	50	100	100	150
–	35	15	60	60	120	120	150
40	40	15	60	60	120	120	180
45	45	15	60	60	120	120	180
50	50	15	60	60	120	120	180
60	–	15	60	60	120	120	180
–	60	18	72	72	142	142	212
63	–	18	72	72	142	142	212
70	70	18	72	72	142	142	212
80	80	18	72	72	142	142	212
90	–	18	72	72	142	142	212
–	90	18	85	85	165	165	245
100	100	18	85	85	165	165	245
110	110	18	85	85	165	165	245
120	120	18	85	85	165	165	245
140	–	18	85	85	165	165	245
160	140	18	100	100	192	192	284
180	160	18	100	100	192	192	284
200	180	18	100	100	192	192	284
–	200	18	110	110	214	214	318
220	220	18	110	110	214	214	318

240	-	18	110	110	214	214	318
250	240	18	125	125	239	239	353
260	260	18	125	125	239	239	353
280	280	18	125	125	239	239	353
300	-	18	125	125	239	239	353

## Normal internal clearance

The normal internal clearance gives an optimum operating clearance under normal operating conditions if the recommended fits are used.

Radial internal clearance larger or smaller than normal

In order to meet the requirements arising from different operating or installation conditions, the bearings are also available with (Table 1):

- internal clearance larger than normal:

—where tight fits are used or there are large temperature differences between the inner and outer ring

- internal clearance smaller than normal:

—for bearing arrangements with very small clearance.

## Suffixes

Spherical plain bearings with normal internal clearance do not have a suffix.

Bearings with a radial internal clearance C2 and C3 differ from the standard design. They are ordered using a suffix.

Example

Spherical plain bearing GE 60 DO with reduced internal clearance: GE 60 DO-C2.

## Axial internal clearance

The axial internal clearance is defined as the amount by which the inner ring can be moved in an axial direction relative to the outer ring from one extreme position to the other. It is dependent on the bearing geometry and is in a direct relationship to the radial internal clearance. Depending on the bearing type, it may be several times greater than the radial internal clearance.

## Internal clearance of cylindrical plain bushes

Bearings requiring maintenance must have a minimum radial internal clearance for lubrication. Maintenance-free cylindrical plain bushes have an integral solid lubricant supply. They do not therefore require this minimum radial clearance for lubrication purposes.

Fitting without clearance has particular advantages, especially with alternating load directions. Load distribution is also improved, especially during running-in, due to the larger load-bearing areas.

In order to achieve the largest possible load-bearing angle, the operating clearance S must not exceed defined limits.

The clearance can be expressed as a function of the relative internal clearance  $\psi$  (Figure 1 and formula).

For bore diameters  $d = 30 \text{ mm}$  to  $200 \text{ mm}$ , guide values are given in Table 2.

These ranges can be used:

- due to the standard tolerances of the plain bushes and
- if the housing bore and shaft are manufactured to the "average tolerance"

$$S = \psi \cdot d$$

$$S \quad \mu\text{m}$$

Operating clearance

$$\psi \quad \%$$

Relative internal clearance in fitted condition

$$d \quad \text{mm}$$

Shaft diameter or bore diameter of inner ring.



Table 2: Bore diameter and relative internal clearance  $\psi$  in fitted condition—guide values

Bore diameter (mm)		
$d < 80$	$d \geq 80 \text{ to } 120$	$d > 120 \text{ to } 200$
$\psi \leq 1\%$	$\psi \leq 0.75\%$	$\psi \leq 0.5\%$

### Fits related to practical use for spherical plain bearings

Tables 3 and 4 show the tolerances and clearances which result from the corresponding ISO fits in conjunction with normal bearing tolerances to ISO 12 240–1 to –3 when the actual dimensions correspond to "average tolerance":

- – indicates interference
- + indicates clearance.

Table 3: Fits for shafts–interference  $U_I$  in  $\mu\text{m}$ <sup>1)2)</sup>

Bearing inner ring /shaft	Designation	Nominal deviation range in $\mu\text{m}$											
		Over 3 incl. 6	6 10	10 18	18 30	30 50	50 80	80 120	120 180	180 250	250 315	315 400	400 500
	<b>h6</b>	0	0	+1	+1	+2	+2	+1	0	0	-2	-2	-2
	<b>j6</b>	-6	-7	-7	-8	-9	-10	-13	-14	-17	-17	-20	-22
	<b>k6</b>	-9	-9	-9	-14	-16	-20	-24	-28	-30	-33	-38	-42
	<b>m6</b>	-12	-15	-17	-20	-23	-28	-34	-40	-47	-53	-59	-65
	<b>n6</b>	-16	-19	-22	-27	-31	-37	-44	-52	-61	-67	-75	-82

Notes:

- 1) Example: shaft, diameter 50 m6; probable interference 0.023 mm.
- 2) Not applicable to series GE..LO

Table 4: Fits for housing bores–interference  $U_A$  or clearance in  $\mu\text{m}$ <sup>1)</sup>

Bearing inner ring / housing	Designation	Nominal deviation range in $\mu\text{m}$											
		Over 6 incl. 10	10 18	18 30	30 50	50 80	80 120	120 150	150 180	180 250	250 315	315 400	400 500
	<b>J7</b>	+4	+5	+6	+7	+10	+12	+15	+18	+22	+27	+31	+34
	<b>K7</b>	+1	+1	-1	0	0	-1	+1	+4	+5	+7	+8	+8
	<b>M7</b>	-4	-5	-7	-8	-9	-11	-11	-8	-8	-9	-9	-10
	<b>N7</b>	-8	-10	-14	-16	-18	-21	-23	-20	-22	-23	-25	-27
	<b>J7</b>	+4	+5	+6	+7	+10	+12	+15	+18	+22	+27	+31	+34

Note:

- 1) Example: Housing bore, diameter 75 M7;  
probable interference 0.009 mm.

## Design of bearing arrangements

### Radial location of spherical plain bearings & maintenance-free cylindrical plain bushes

In spherical plain bearings, sliding motion should occur between the spherical sliding surfaces of the inner and outer rings—the quality and treatment of the surfaces are matched to this purpose. The internal clearance and osculation of the sliding surfaces must therefore be in a balanced relationship.

#### Spherical plain bearings requiring maintenance

The operating life of spherical plain bearings requiring maintenance is reduced by:

- preload on the sliding surfaces
- excessively small load-bearing areas on the sliding surfaces due to unacceptably large internal clearance.

The recommended fits are given in Table 5:

**Caution!** If tighter fits are required, for example due to high impact type loads, the operating clearance must be checked by calculation.

#### Maintenance-free spherical plain bearings

Looser fits may be used with maintenance-free bearings:

- due to the hard chromium/PTFE sliding contact surface, friction is lower than with steel/steel sliding contact surfaces.

The recommended fits are given in Table 6.

#### Application as locating bearings

The shaft and bore fits must be selected such that no sliding motion occurs on the shaft or in the bore.

- Tight fits prevent damage to the adjacent construction.

When using tight fits, however, it must be noted that:

- interference between the housing and outer ring causes contraction of the outer ring
- interference between the shaft and bearing bore causes expansion of the inner ring.

These elastic deformations of the bearing rings reduce the internal clearance of the bearing. If a tight fit is not possible, the bearing rings must be secured against axial sliding motion on the shaft or in the housing.

#### Application as non-locating bearings (between shaft and bearing bore)

The surface of the shaft must be wear-resistant as follows:

- surface hardness  $\geq 56$  HRC
- maximum surface roughness Rz10.

Spherical plain bearings requiring maintenance should then only be lubricated via the shaft. Maintenance-free spherical plain bearings can have a lining of sliding material PTFE in the inner ring bore.

Table 5: Shaft and housing fits for spherical plain bearings requiring maintenance:

Spherical plain bearings requiring maintenance	Internal Clearance Group	Material	
		Housing/shaft Steel/steel	Housing/shaft Light metal/steel
Radial spherical plain bearings	C2	K7/j6 <sup>1)</sup>	M7/j6 <sup>1)</sup>
Radial spherical plain bearings	CN (normal)	M7/m6 <sup>1)</sup>	N7/m6 <sup>1)</sup>
Radial spherical plain bearings	C3	M7/m6 <sup>1)</sup>	N7/m6 <sup>1)</sup>
Angular contact spherical plain bearings	–	M7/n6	–
Axial spherical plain bearings	–	M7/n6	–

Note: 1) GE..LO: for shaft r6.

Table 6: Shaft and housing fits for maintenance-free spherical plain bearings and maintenance-free cylindrical plain bushes

Maintenance-free spherical plain bearings/ maintenance-free cylindrical plain bushes	Bore D mm	Material	
		Housing/shaft Steel/steel	Housing/shaft Light metal/steel
Radial spherical plain bearings	up to 300	K7/j6	M7/j6
Radial spherical plain bearings	over 300	J7/j6	—
Angular contact spherical plain bearings	—	M7/m6	—
Axial spherical plain bearings	—	M7/m6	—
Radial spherical plain bearings	—	H7/f7	—

## Operating temperatures

The permissible operating temperature is dependent on:

- the sliding contact surface
- the sealing arrangement.

If the operating temperature exceeds the values in Table 7, this will reduce:

- the life of the bearing
- the efficacy of the sealing arrangement.

If sealed bearings must be used at high temperatures, an unsealed bearing with external heat-resistant seals can be used. The influence of temperature on life is taken into consideration by means of temperature factors.

Table 7: Operating temperatures for spherical plain bearings and maintenance-free cylindrical plain bushes

Spherical plain bearings/ plain bushes	Series	Temperature		Reduced life
		°C from	to	°C from
requiring maintenance	GE..DO	-60	+200	+150
	GE..DO-2RS <sup>1)</sup>	-30	+130	—
	GE..FO	-60	+200	+150
	GE..FO-2RS <sup>1)</sup>	-30	+130	—
	GE..LO	-60	+200	+150
	GE..HO-2RS <sup>1)</sup>	-30	+130	—
	GE..ZO	-60	+200	+150
	GE..AX	-60	+200	+150
maintenance free	GE..UK	-50	+200	+ 95
	GE..UK-2RS <sup>1)</sup>	-30	+130	-20
	GE..FW	-50	+200	+ 95
	GE..FW-2RS <sup>1)</sup>	-30	+130	-20
	GE..AW	-50	+150	-20

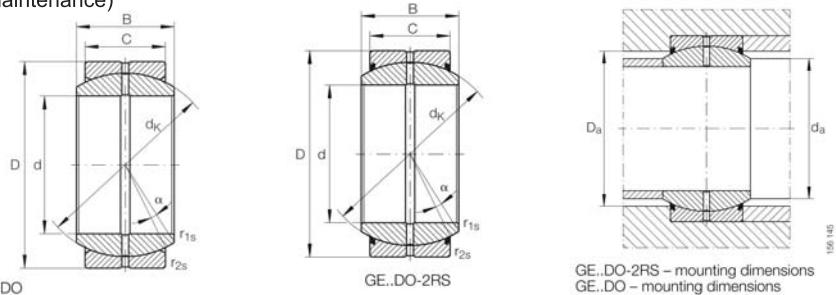
Note:

- 1) Without seals: for temperatures from -60°C to +200°C.
- 2) Without seals: for temperatures from -50°C to +150°C.

## Spherical Plain Bearings & Rod Ends

### Radial Spherical Plain Bearings

Metric-Open & Sealed(requiring maintenance)



#### Technical Parameters:

Shaft diameter d	Bearing Code		Mass kg	Dimensions						Degree s
	without seals	With seals		d	D	B	C	d_k	α	
6	GE 6 DO <sup>1)</sup>	—	0.004	6–0.008	14–0.008	6–0.12	4–0.24	10 <sup>2)</sup>	13	
8	GE 8 DO <sup>1)</sup>	—	0.007	8–0.008	16–0.008	8–0.12	5–0.24	13 <sup>2)</sup>	15	
10	GE 10 DO <sup>1)</sup>	—	0.012	10–0.008	19–0.009	9–0.12	6–0.24	16 <sup>2)</sup>	12	
12	GE 12 DO <sup>1)</sup>	—	0.017	12–0.008	22–0.009	10–0.12	7–0.24	18 <sup>2)</sup>	11	
15	GE 15 DO	—	0.027	15–0.008	26–0.009	12–0.12	9–0.24	22 <sup>2)</sup>	8	
16	GE 16 DO	—	0.044	16–0.008	30–0.009	14–0.12	10–0.24	25 <sup>2)</sup>	10	
17	GE 17 DO	GE 17 DO–2RS	0.041	17–0.008	30–0.009	14–0.12	10–0.24	25 <sup>2)</sup>	10	
20	GE 20 DO	GE 20 DO–2RS	0.065	20–0.01	35–0.011	16–0.12	12–0.24	29 <sup>2)</sup>	9	
25	GE 25 DO	GE 25 DO–2RS	0.12	25–0.01	42–0.011	20–0.12	16–0.24	35.5	7	
30	GE 30 DO	GE 30 DO–2RS	0.15	30–0.01	47–0.011	22–0.12	18–0.24	40.7	6	
35	GE 35 DO	GE 35 DO–2RS	0.23	35–0.012	55–0.013	25–0.12	20–0.3	47	6	
40	GE 40 DO	GE 40 DO–2RS	0.32	40–0.012	62–0.013	28–0.12	22–0.3	53	7	
45	GE 45 DO	GE 45 DO–2RS	0.41	45–0.012	68–0.013	32–0.12	25–0.3	60	7	
50	GE 50 DO	GE 50 DO–2RS	0.53	50–0.012	75–0.013	35–0.12	28–0.3	66	6	
60	GE 60 DO	GE 60 DO–2RS	1	60–0.015	90–0.015	44–0.15	36–0.4	80	6	
70	GE 70 DO	GE 70 DO–2RS	1.5	70–0.015	105–0.015	49–0.15	40–0.4	92	6	
80	GE 80 DO	GE 80 DO–2RS	2.2	80–0.015	120–0.015	55–0.15	45–0.4	105	6	
90	GE 90 DO	GE 90 DO–2RS	2.7	90–0.02	130–0.018	60–0.2	50–0.5	115	5	
100	GE 100 DO	GE 100 DO–2RS	4.3	100–0.02	150–0.018	70–0.2	55–0.5	130	7	
110	GE 110 DO	GE 110 DO–2RS	4.7	110–0.02	160–0.025	70–0.2	55–0.5	140	6	
120	GE 120 DO	GE 120 DO–2RS	8	120–0.02	180–0.025	85–0.2	70–0.5	160	6	
140	GE 140 DO	GE 140 DO–2RS	11	140–0.025	210–0.03	90–0.25	70–0.6	180	7	
160	GE 160 DO	GE 160 DO–2RS	14	160–0.025	230–0.03	105–0.25	80–0.6	200	8	
180	GE 180 DO	GE 180 DO–2RS	18.2	180–0.025	260–0.035	105–0.25	80–0.7	225	6	
200	GE 200 DO	GE 200 DO–2RS	28.3	200–0.03	290–0.035	130–0.3	100–0.7	250	7	
220	—	GE 220 DO–2RS	35.4	220–0.03	320–0.04	135–0.3	100–0.8	275	8	
240	—	GE 240 DO–2RS	39.4	240–0.03	340–0.04	140–0.3	100–0.8	300	8	
260	—	GE 260 DO–2RS	51.1	260–0.035	370–0.04	150–0.35	110–0.8	325	7	
280	—	GE 280 DO–2RS	64.6	280–0.035	400–0.04	155–0.35	120–0.8	350	6	
300	—	GE 300 DO–2RS	77.3	300–0.035	430–0.045	165–0.35	120–0.9	375	7	

#### Remarks:

- 1) No relubrication facility.
- 2) No lubrication groove on inner ring spherical surface.
- 3) Also available in groups C2 and C3.

## Material

Made from high quality rolling bearing steel

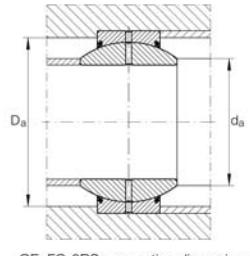
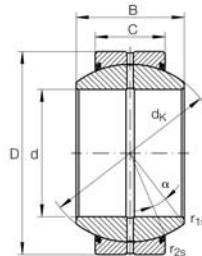
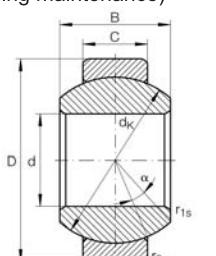
Sliding contact surface—Steel/steel

				Basic Load Rating		Radial internal clearance	Shaft diameter
$r_{1s}$	$r_{2s}$	$d_a$	$D_a^{1)}$	dyn Cr	stat. Cor	CN	
min	min	max	max	N	N		
0.3	0.3	8	9.6	3 400	17 000	0.032–0.068	6
0.3	0.3	10.2	12.5	5 500	27 500	0.032–0.068	8
0.3	0.3	13.2	15.5	8 150	40 500	0.032–0.068	10
0.3	0.3	14.9	17.5	10 800	54 000	0.032–0.068	12
0.3	0.3	18.4	21	17 000	85 000	0.04–0.082	15
0.3	0.3	20.7	24	21 200	106 000	0.04–0.082	16
0.3	0.3	20.7	24	21 200	106 000	0.04–0.082	17
0.3	0.3	24.1	27.5	30 000	146 000	0.04–0.082	20
0.6	0.6	29.3	33	48 000	240 000	0.05–0.1	25
0.6	0.6	34.2	38	62 000	310 000	0.05–0.1	30
0.6	1	39.7	44.5	80 000	400 000	0.05–0.1	35
0.6	1	45	51	100 000	500 000	0.06–0.12	40
0.6	1	50.7	57	127 000	640 000	0.06–0.12	45
0.6	1	55.9	63	156 000	780 000	0.06–0.12	50
1	1	66.8	75	245 000	1 220 000	0.06–0.12	60
1	1	77.8	87	315 000	1 560 000	0.072–0.142	70
1	1	89.4	99	400 000	2 000 000	0.072–0.142	80
1	1	98.1	108	490 000	2 450 000	0.072–0.142	90
1	1	109.5	123	610 000	3 050 000	0.085–0.165	100
1	1	121.2	134	655 000	3 250 000	0.085–0.165	110
1	1	135.5	150	950 000	4 750 000	0.085–0.165	120
1	1	155.8	173	1 080 000	5 400 000	0.085–0.165	140
1	1	170.2	191	1 370 000	6 800 000	0.1–0.192	160
1.1	1.1	198.9	219	1 530 000	7 650 000	0.1–0.192	180
1.1	1.1	213.5	239	2 120 000	10 600 000	0.1–0.192	200
1.1	1.1	239.5	267	2 320 000	11 600 000	0.11–0.214	220
1.1	1.1	265.3	295	2 550 000	12 700 000	0.11–0.214	240
1.1	1.1	288.3	319	3 050 000	15 300 000	0.125–0.239	260
1.1	1.1	313.8	342	3 550 000	18 000 000	0.125–0.239	280
1.1	1.1	336.7	370	3 800 000	19 000 000	0.125–0.239	300

# Spherical Plain Bearings & Rod Ends

## Radial Spherical Plain Bearings

Metric-Open & Sealed(requiring maintenance)



GE..FO-2RS – mounting dimensions  
GE..FO – mounting dimensions

### Technical Parameters:

GE..FO

GE..FO-2RS

Shaft diameter d	Bearing Code		Mass kg	Dimensions						Degree
				d	D	B	C	dk	α	
	without seals	With seals		mm						Degree
6	GE 6 FO <sup>1)</sup>	–	0.008	6–0.008	16–0.008	9–0.12	5–0.24	13 <sup>3)</sup>	21	
8	GE 8 FO <sup>1)</sup>	–	0.014	8–0.008	19–0.009	11–0.12	6–0.24	16 <sup>3)</sup>	21	
10	GE 10 FO <sup>1)</sup>	–	0.02	10–0.008	22–0.009	12–0.12	7–0.24	18 <sup>3)</sup>	18	
12	GE 12 FO <sup>2)</sup>	–	0.034	12–0.008	26–0.009	15–0.12	9–0.24	22 <sup>3)</sup>	18	
15	–	GE 15 FO–2RS	0.046	15–0.008	30–0.009	16–0.12	10–0.24	25 <sup>3)</sup>	16	
17	–	GE 17 FO–2RS	0.077	17–0.008	35–0.011	20–0.12	12–0.24	29 <sup>3)</sup>	19	
20	–	GE 20 FO–2RS	0.15	20–0.01	42–0.011	25–0.12	16–0.24	35.5	17	
25	–	GE 25 FO–2RS	0.19	25–0.01	47–0.011	28–0.12	18–0.24	40.7	17	
30	–	GE 30 FO–2RS	0.29	30–0.01	55–0.013	32–0.12	20–0.3	47	17	
35	–	GE 35 FO–2RS	0.38	35–0.012	62–0.013	35–0.12	22–0.3	53	16	
40	–	GE 40 FO–2RS	0.54	40–0.012	68–0.013	40–0.12	25–0.3	60	17	
45	–	GE 45 FO–2RS	0.68	45–0.012	75–0.013	43–0.12	28–0.3	66	15	
50	–	GE 50 FO–2RS	1.4	50–0.012	90–0.015	56–0.15	36–0.4	80	17	
60	–	GE 60 FO–2RS	2	60–0.015	105–0.015	63–0.15	40–0.4	92	17	
70	–	GE 70 FO–2RS	2.9	70–0.015	120–0.015	70–0.15	45–0.4	105	16	
80	–	GE 80 FO–2RS	3.5	80–0.015	130–0.018	75–0.2	50–0.5	115	14	
90	–	GE 90 FO–2RS	5.4	90–0.02	150–0.018	85–0.2	55–0.5	130	15	
100	–	GE 100 FO–2RS	5.9	100–0.02	160–0.025	85–0.2	55–0.5	140	14	
110	–	GE 110 FO–2RS	9.6	110–0.02	180–0.025	100–0.2	70–0.5	160	12	
120	–	GE 120 FO–2RS	15.1	120–0.02	210–0.03	115–0.25	70–0.6	180	16	
140	–	GE 140 FO–2RS	18.8	140–0.025	230–0.03	130–0.25	80–0.6	200	16	
160	–	GE 160 FO–2RS	24.7	160–0.025	260–0.035	135–0.25	80–0.7	225	16	
180	–	GE 180 FO–2RS	35.4	180–0.025	290–0.035	155–0.3	100–0.7	250	14	
200	–	GE 200 FO–2RS	44.8	200–0.03	320–0.04	165–0.3	100–0.8	275	15	
220	–	GE 220 FO–2RS	50.9	220–0.03	340–0.04	175–0.3	100–0.8	300	16	
240	–	GE 240 FO–2RS	64.9	240–0.03	370–0.04	190–0.35	110–0.8	325	15	
260	–	GE 260 FO–2RS	81.7	260–0.035	400–0.04	205–0.35	120–0.8	350	15	
280	–	GE 280 FO–2RS	96.5	280–0.035	430–0.045	210–0.35	120–0.9	375	15	

### Remarks:

- 1) No relubrication facility.
- 2) Can only be relubricated via the outer ring.
- 3) No lubrication groove on inner ring spherical surface.
- 4) Also available in groups C2 and C3.

## Material

Made from high quality rolling bearing steel

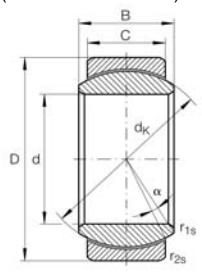
Sliding contact surface—Steel/steel

Dimensions				Basic Load Rating		Radial internal clearance	Shaft diameter
$r_{1s}$	$r_{2s}$	$d_a$	$D_a^{1)}$	dyn Cr	stat. Cor	CN	
min	min	max	max	N	N		
0.3	0.3	9.3	12.5	5 500	27 500	0.032–0.068	6
0.3	0.3	11.6	15.5	8 150	40 500	0.032–0.068	8
0.3	0.3	13.4	17.5	10 800	54 000	0.032–0.068	10
0.3	0.3	16	21	17 000	85 000	0.04–0.082	12
0.3	0.3	19.2	24	21 200	106 000	0.04–0.082	15
0.3	0.3	21	27.5	30 000	146 000	0.04–0.082	17
0.3	0.6	25.2	33	48 000	240 000	0.05–0.1	20
0.6	0.6	29.5	38	62 000	310 000	0.05–0.1	25
0.6	1	34.4	44.5	80 000	400 000	0.05–0.1	30
0.6	1	39.7	51	100 000	500 000	0.06–0.12	35
0.6	1	44.7	57	127 000	640 000	0.06–0.12	40
0.6	1	50	63	156 000	780 000	0.06–0.12	45
0.6	1	57.1	75	245 000	1 220 000	0.06–0.12	50
1	1	67	87	315 000	1 560 000	0.072–0.142	60
1	1	78.2	99	400 000	2 000 000	0.072–0.142	70
1	1	87.1	108	490 000	2 450 000	0.072–0.142	80
1	1	98.3	123	610 000	3 050 000	0.085–0.165	90
1	1	111.2	134	655 000	3 250 000	0.085–0.165	100
1	1	124.8	150	950 000	4 750 000	0.085–0.165	110
1	1	138.4	173	1 080 000	5 400 000	0.085–0.165	120
1	1	151.9	191	1 370 000	6 800 000	0.1–0.192	140
1	1.1	180	219	1 530 000	7 650 000	0.1–0.192	160
1.1	1.1	196.1	239	2 120 000	10 600 000	0.1–0.192	180
1.1	1.1	220	267	2 320 000	11 600 000	0.11–0.214	200
1.1	1.1	243.6	295	2 550 000	12 700 000	0.11–0.214	220
1.1	1.1	263.6	319	3 050 000	15 300 000	0.125–0.239	240
1.1	1.1	283.6	342	3 550 000	18 000 000	0.125–0.239	260
1.1	1.1	310.6	370	3 800 000	19 000 000	0.125–0.239	280

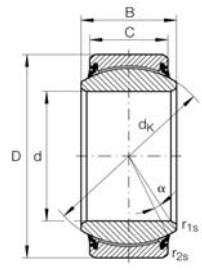
# Spherical Plain Bearings & Rod Ends

## Radial Spherical Plain Bearings

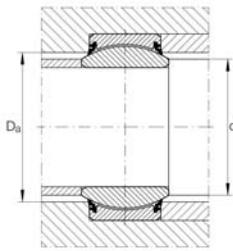
Metric-Open & Sealed(Maintenance-free)



GE.UK



GE.UK-2RS



GE.UK-2RS – mounting dimensions  
GE.UK – mounting dimensions

### Technical Parameters:

Shaft diameter d	Bearing Code		Mass kg	Dimensions						Degree
				d	D	B	C	dk	α	
	without seals	With seals		mm						Degree
6	GE 6 UK	–	0.004	6–0.008	14–0.008	6–0.12	4–0.24	10	13	
8	GE 8 UK	–	0.007	8–0.008	16–0.008	8–0.12	5–0.24	13	15	
10	GE 10 UK	–	0.011	10–0.008	19–0.009	9–0.12	6–0.24	16	12	
12	GE 12 UK	–	0.016	12–0.008	22–0.009	10–0.12	7–0.24	18	11	
15	GE 15 UK	–	0.027	15–0.008	26–0.009	12–0.12	9–0.24	22	8	
17	GE 17 UK	GE 17 UK-2RS	0.037	17–0.008	30–0.009	14–0.12	10–0.24	25	10	
20	GE 20 UK	GE 20 UK-2RS	0.06	20–0.01	35–0.011	16–0.12	12–0.24	29	9	
25	GE 25 UK	GE 25 UK-2RS	0.11	25–0.01	42–0.011	20–0.12	16–0.24	35.5	7	
30	GE 30 UK	GE 30 UK-2RS	0.14	30–0.01	47–0.011	22–0.12	18–0.24	40.7	6	
35	–	GE 35 UK-2RS	0.22	35–0.012	55–0.013	25–0.12	20–0.3	47	6	
40	–	GE 40 UK-2RS	0.3	40–0.012	62–0.013	28–0.12	22–0.3	53	7	
45	–	GE 45 UK-2RS	0.39	45–0.012	68–0.013	32–0.12	25–0.3	60	7	
50	–	GE 50 UK-2RS	0.53	50–0.012	75–0.013	35–0.12	28–0.3	66	6	
60	–	GE 60 UK-2RS	0.98	60–0.015	90–0.015	44–0.15	36–0.4	80	6	
70	–	GE 70 UK-2RS	1.5	70–0.015	105–0.015	49–0.15	40–0.4	92	6	
80	–	GE 80 UK-2RS	2.2	80–0.015	120–0.015	55–0.15	45–0.4	105	6	
90	–	GE 90 UK-2RS	2.7	90–0.02	130–0.018	60–0.2	50–0.5	115	5	
100	–	GE 100 UK-2RS	4.2	100–0.02	150–0.018	70–0.2	55–0.5	130	7	
110	–	GE 110 UK-2RS	4.7	110–0.02	160–0.025	70–0.2	55–0.5	140	6	
120	–	GE 120 UK-2RS	8.1	120–0.02	180–0.025	85–0.2	70–0.5	160	6	
140	–	GE 140 UK-2RS	10.6	140–0.025	210–0.03	90–0.25	70–0.6	180	7	
160	–	GE 160 UK-2RS	13.8	160–0.025	230–0.03	105–0.25	80–0.6	200	8	
180	–	GE 180 UK-2RS	17.4	180–0.025	260–0.035	105–0.25	80–0.7	225	6	
200	–	GE 200 UK-2RS	26	200–0.03	290–0.035	130–0.3	100–0.7	250	7	
220	–	GE 220 UK-2RS	35.5	220–0.03	320–0.04	135–0.3	100–0.8	275	8	
240	–	GE 240 UK-2RS	39	240–0.03	340–0.04	140–0.3	100–0.8	300	8	
260	–	GE 260 UK-2RS	50.8	260–0.035	370–0.04	150–0.35	110–0.8	325	7	
280	–	GE 280 UK-2RS	64.7	280–0.035	400–0.04	155–0.35	120–0.8	350	6	
300	–	GE 300 UK-2RS	76.7	300–0.035	430–0.045	165–0.35	120–0.9	375	7	

### Remarks:

- 1) Basic load rating for bearing design GE..UK-2RS.
- 2) Sliding material: PTFE composite

## Material

Race—Alloy steel, heat treated, PTFE liner

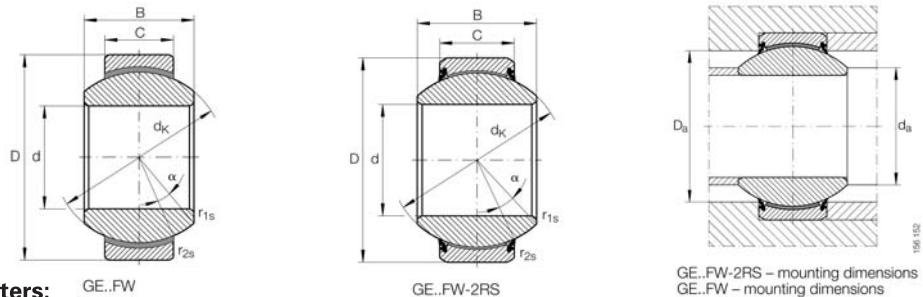
Ball—Hardened and ground rolling bearing chromium steel

Chamfer dimensions		Mounting dimensions		Basic Load Rating		Radial internal clearance	Shaft diameter
r <sub>1s</sub>	r <sub>2s</sub>	d <sub>a</sub>	D <sub>a</sub>	dyn Cr	stat. Cor	CN	
min	min	max	max	N	N		
0.3	0.3	8	9.6	3600	9000	0–0.032	6
0.3	0.3	10.2	12.5	5850	14 600	0–0.032	8
0.3	0.3	13.2	15.5	8650	21 600	0–0.032	10
0.3	0.3	14.9	17.5	11 400	28 500	0–0.032	12
0.3	0.3	18.4	21	17 600	44 000	0–0.04	15
0.3	0.3	20.7	24	22 400	56 000	0–0.04	17
0.3	0.3	24.1	27.5	31 500	78 000	0–0.04	20
0.6	0.6	29.3	33	51 000	127 000	0–0.05	25
0.6	0.6	34.2	38	65 500	166 000	0–0.05	30
0.6	1	39.7	44.5	210 000 <sup>1)</sup>	350 000 <sup>1)</sup>	0–0.05	35
0.6	1	45	51	277 000 <sup>1)</sup>	462 000 <sup>1)</sup>	0–0.06	40
0.6	1	50.7	57	360 000 <sup>1)</sup>	600 000 <sup>1)</sup>	0–0.06	45
0.6	1	55.9	63	442 000 <sup>1)</sup>	737 000 <sup>1)</sup>	0–0.06	50
1	1	66.8	75	690 000 <sup>1)</sup>	1 150 000 <sup>1)</sup>	0–0.06	60
1	1	77.8	87	885 000 <sup>1)</sup>	1 475 000 <sup>1)</sup>	0–0.072	70
1	1	89.4	99	1 125 000 <sup>1)</sup>	1 875 000 <sup>1)</sup>	0–0.072	80
1	1	98.1	108	1 380 000 <sup>1)</sup>	2 300 000 <sup>1)</sup>	0–0.072	90
1	1	109.5	123	1 717 000 <sup>1)</sup>	2 862 000 <sup>1)</sup>	0–0.085	100
1	1	121.2	134	1 845 000 <sup>1)</sup>	3 075 000 <sup>1)</sup>	0–0.085	110
1	1	135.5	150	2 685 000 <sup>1)</sup>	4 475 000 <sup>1)</sup>	0–0.085	120
1	1	155.8	173	3 015 000 <sup>1)</sup>	5 025 000 <sup>1)</sup>	0–0.085	140
1	1	170.2	191	3 840 000 <sup>1)</sup>	6 400 000 <sup>1)</sup>	0–0.1	160
1.1	1.1	198.9	219	4 320 000 <sup>1)</sup>	7 200 000 <sup>1)</sup>	0–0.1	180
1.1	1.1	213.5	239	6 000 000 <sup>1)</sup>	10 000 000 <sup>1)</sup>	0–0.1	200
1.1	1.1	239.5	267	6 600 000 <sup>1)</sup>	11 000 000 <sup>1)</sup>	0–0.1	220
1.1	1.1	265.3	295	7 200 000 <sup>1)</sup>	12 000 000 <sup>1)</sup>	0–0.1	240
1.1	1.1	288.3	319	8 550 000 <sup>1)</sup>	14 250 000 <sup>1)</sup>	0–0.11	260
1.1	1.1	313.8	342	10 050 000 <sup>1)</sup>	16 750 000 <sup>1)</sup>	0–0.11	280
1.1	1.1	336.7	370	10 800 000 <sup>1)</sup>	18 000 000 <sup>1)</sup>	0–0.11	300

## Spherical Plain Bearings & Rod Ends

### Radial Spherical Plain Bearings

Maintenance-free



#### Technical Parameters:

GE..FW

GE..FW-2RS

GE..FW-2RS – mounting dimensions  
GE..FW – mounting dimensions

Shaft diameter  d	Bearing Code		Mass kg	Dimensions						Degree
				d	D	B	C	dk	α	
	without seals	With seals		mm						Degree
6	GE 6 FW	–	0.009	6–0.008	16–0.008	9–0.12	5–0.24	13	21	
8	GE 8 FW	–	0.014	8–0.008	19–0.009	11–0.12	6–0.24	16	21	
10	GE 10 FW	–	0.02	10–0.008	22–0.009	12–0.12	7–0.24	18	18	
12	GE 12 FW	–	0.036	12–0.008	26–0.009	15–0.12	9–0.24	22	18	
15	GE 15 FW	–	0.049	15–0.008	30–0.009	16–0.12	10–0.24	25	16	
17	GE 17 FW	–	0.082	17–0.008	35–0.011	20–0.12	12–0.24	29	19	
20	GE 20 FW	–	0.16	20–0.01	42–0.011	25–0.12	16–0.24	35.5	17	
25	GE 25 FW	–	0.2	25–0.01	47–0.011	28–0.12	18–0.24	40.7	17	
30	–	GE 30 FW-2RS	0.28	30–0.01	55–0.013	32–0.12	20–0.3	47	17	
35	–	GE 35 FW-2RS	0.38	35–0.012	62–0.013	35–0.12	22–0.3	53	16	
40	–	GE 40 FW-2RS	0.53	40–0.012	68–0.013	40–0.12	25–0.3	60	17	
45	–	GE 45 FW-2RS	0.67	45–0.012	75–0.013	43–0.12	28–0.3	66	15	
50	–	GE 50 FW-2RS	1.4	50–0.012	90–0.015	56–0.15	36–0.4	80	17	
60	–	GE 60 FW-2RS	2.1	60–0.015	105–0.015	63–0.15	40–0.4	92	17	
70	–	GE 70 FW-2RS	3	70–0.015	120–0.015	70–0.15	45–0.4	105	16	
80	–	GE 80 FW-2RS	3.6	80–0.015	130–0.018	75–0.2	50–0.5	115	14	
90	–	GE 90 FW-2RS	5.3	90–0.02	150–0.018	85–0.2	55–0.5	130	15	
100	–	GE 100 FW-2RS	6	100–0.02	160–0.025	85–0.2	55–0.5	140	14	
110	–	GE 110 FW-2RS	9.8	110–0.02	180–0.025	100–0.2	70–0.5	160	12	
120	–	GE 120 FW-2RS	14.6	120–0.02	210–0.03	115–0.2	70–0.6	180	16	
140	–	GE 140 FW-2RS	18.6	140–0.025	230–0.03	130–0.25	80–0.6	200	16	
160	–	GE 160 FW-2RS	24.9	160–0.025	260–0.035	135–0.25	80–0.7	225	16	
180	–	GE 180 FW-2RS	33.6	180–0.025	290–0.035	155–0.3	100–0.7	250	14	
200	–	GE 200 FW-2RS	44.7	200–0.03	320–0.04	165–0.3	100–0.8	275	15	
220	–	GE 220 FW-2RS	50.8	220–0.03	340–0.04	175–0.3	100–0.8	300	16	
240	–	GE 240 FW-2RS	64	240–0.03	370–0.04	190–0.35	110–0.8	325	15	
260	–	GE 260 FW-2RS	81.8	260–0.035	400–0.04	205–0.35	120–0.8	350	15	
280	–	GE 280 FW-2RS	96.5	280–0.035	430–0.045	210–0.35	120–0.9	375	15	

## Material

Race—Alloy steel, heat treated, PTFE liner

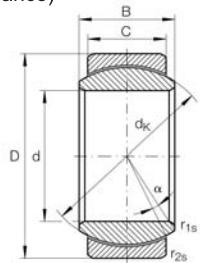
Ball—Hardened and ground rolling bearing chromium steel

Chamfer dimensions		Mounting dimensions		Basic Load Rating		Radial internal clearance	Shaft diameter
r <sub>1s</sub>	r <sub>2s</sub>	d <sub>a</sub>	D <sub>a</sub>	dyn Cr	stat. Cor	CN	
min	min	max	max	N	N		
0.3	0.3	9.3	12.5	5 850	14 600	0–0.032	6
0.3	0.3	11.6	15.5	8 650	21 600	0–0.032	8
0.3	0.3	13.4	17.5	11 400	28 500	0–0.032	10
0.3	0.3	16	21	17 600	44 000	0–0.04	12
0.3	0.3	19.2	24	22 400	56 000	0–0.04	15
0.3	0.3	21	27.5	31 500	78 000	0–0.04	17
0.6	0.6	25.2	33	51 000	127 000	0–0.05	20
0.6	0.6	29.5	38	65 500	166 000	0–0.05	25
0.6	1	34.4	44.5	210 000	350 000	0–0.05	30
0.6	1	39.7	51	277 000	462 000	0–0.06	35
0.6	1	44.7	57	360 000	600 000	0–0.06	40
0.6	1	50	63	442 000	737 000	0–0.06	45
0.6	1	57.1	75	690 000	1 150 000	0–0.06	50
1	1	67	87	885 000	1 475 000	0–0.072	60
1	1	78.2	99	1 125 000	1 875 000	0–0.072	70
1	1	87.1	108	1 380 000	2 300 000	0–0.072	80
1	1	98.3	123	1 717 000	2 862 000	0–0.085	90
1	1	111.2	134	1 845 000	3 075 000	0–0.085	100
1	1	124.8	150	2 685 000	4 475 000	0–0.085	110
1	1	138.4	173	3 015 000	5 025 000	0–0.085	120
1	1	151.9	191	3 840 000	6 400 000	0–0.1	140
1	1.1	180	219	4 320 000	7 200 000	0–0.1	160
1.1	1.1	196.1	239	6 000 000	10 000 000	0–0.1	180
1.1	1.1	220	267	6 600 000	11 000 000	0–0.1	200
1.1	1.1	243.6	295	7 200 000	12 000 000	0–0.1	220
1.1	1.1	263.6	319	8 550 000	14 250 000	0–0.1	240
1.1	1.1	283.6	342	10 050 000	16 750 000	0–0.11	260
1.1	1.1	310.6	370	10 800 000	18 000 000	0–0.11	280

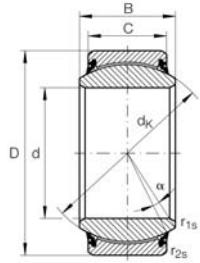
## Spherical Plain Bearings & Rod Ends

### Radial Spherical Plain Bearings

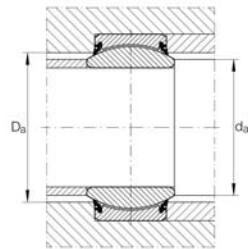
Inch (requiring maintenance)



GE..UK



GE..UK-2RS



GE..UK-2RS – mounting dimensions  
GE..UK – mounting dimensions

#### Technical Parameters:

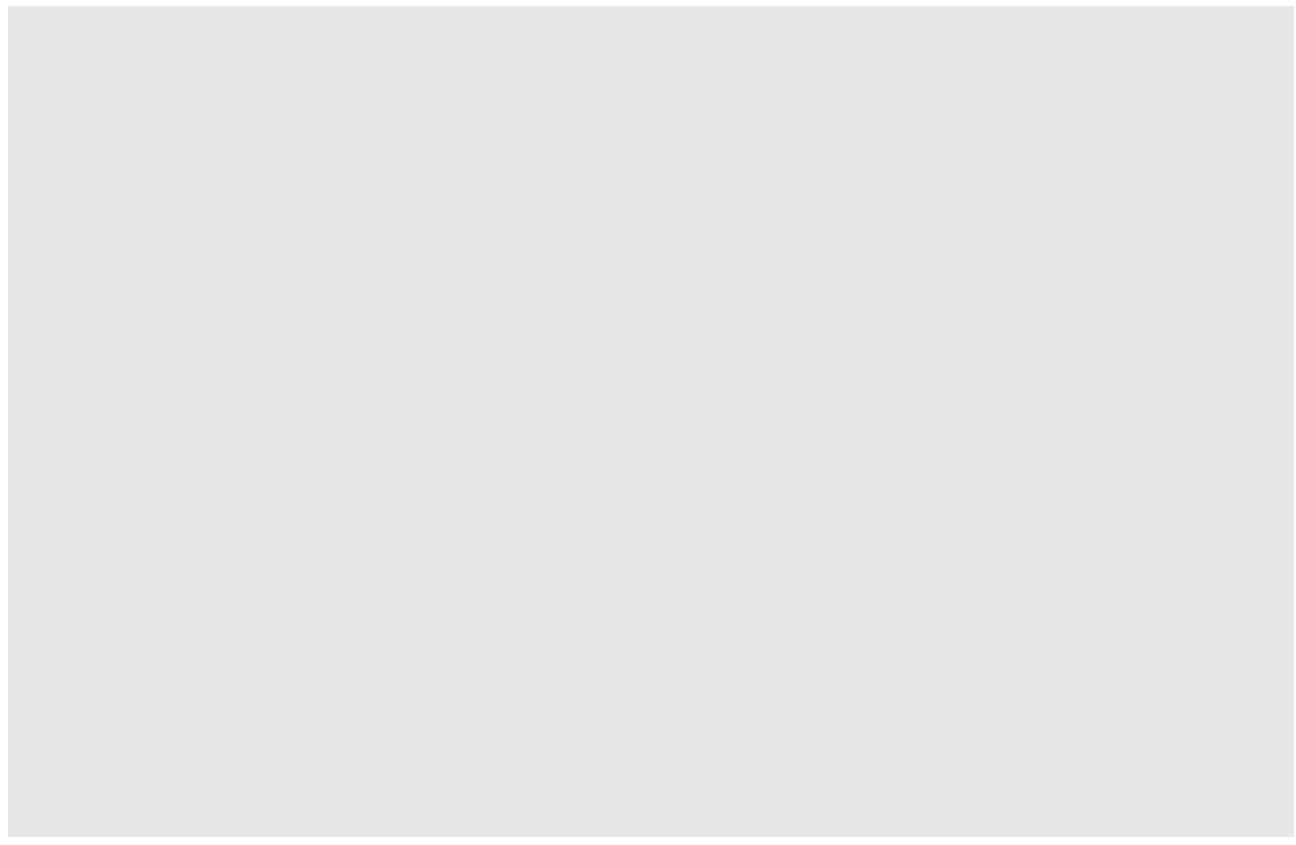
Shaft diameter d	Bearing Code	Mass		Dimensions					Degrees
		d	D	B	C	dk	α		
kg		mm							
19.050	GE 19 ZO	0.051	19.050–0.01	31.7500–0.011	16.662–0.12	14.275–0.2	27.5	6	
22.225	GE 22 ZO	0.084	22.225–0.01	36.5130–0.011	19.431–0.12	16.662–0.24	32	6	
25.400	GE 25 ZO	0.12	25.400–0.01	41.2750–0.011	22.225–0.12	19.050–0.24	35.5	6	
31.750	GE 31 ZO	0.22	31.750–0.012	50.8000–0.013	27.762–0.12	23.800–0.3	45.5	6	
34.925	GE 34 ZO	0.29	34.925–0.012	55.5630–0.013	30.150–0.12	26.187–0.3	49	6	
38.100	GE 38 ZO	0.4	38.100–0.012	61.9130–0.013	33.325–0.12	28.575–0.3	53	6	
44.450	GE 44 ZO	0.62	44.450–0.012	71.4380–0.013	38.887–0.12	33.325–0.3	63.9	6	
50.800	GE 50 ZO	0.92	50.800–0.015	80.9630–0.015	44.450–0.15	38,100–0.4	73	6	
57.150	GE 57 ZO	1.6	57.150–0.015	90.4880–0.015	50.013–0.15	42,850–0.4	82	6	
63.500	GE 63 ZO	1.7	63.500–0.015	100.0130–0.015	55.550–0.15	47,625–0.4	92	6	
69.850	GE 69 ZO	2.3	69.850–0.015	111.1250–0.015	61.112–0.15	52.375–0.4	100	6	
76.200	GE 76 ZO	3	76.200–0.015	120.6500–0.018	66.675–0.15	57,150–0.5	109.5	6	

## Material

Made from high quality rolling bearing steel

Sliding contact surface—Steel/steel

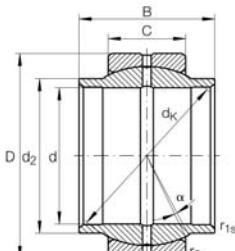
Chamfer dimensions		Mounting dimensions		Basic Load Rating		Radial internal clearance	Shaft diameter
r <sub>1s</sub>	r <sub>2s</sub>	d <sub>a</sub>	D <sub>a</sub>	dyn Cr	stat. Cor	CN	
min	min	max	max	N	N		
0.3	0.6	21.8	24.5	31 400	94 200	0.08–0.18	19.050
0.3	0.6	25.4	28.5	42 600	127 000	0.08–0.18	22.225
0.3	0.6	27.6	31.5	54 100	162 000	0.08–0.18	25.400
0.6	0.6	36	40.5	86 600	259 000	0.08–0.18	31.750
0.6	1	38.6	43.5	102 000	307 000	0.08–0.18	34.925
0.6	1	41.2	46.5	121 000	363 000	0.08–0.18	38.100
0.6	1	50.7	57	170 000	511 000	0.08–0.18	44.450
0.6	1	57.9	65	222 000	667 000	0.08–0.18	50.800
0.6	1	64.9	73	281 000	843 000	0.1–0.2	57.150
1	1	73.3	82	350 000	1050 000	0.1–0.2	63.500
1	1	79.1	89	419 000	1250 000	0.1–0.2	69.850
1	1	86.8	98	500 000	1500 000	0.1–0.2	76.200



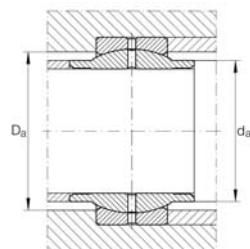
## Spherical Plain Bearings & Rod Ends

### Radial Spherical Plain Bearings

Metric(requiring maintenance)



GE..LO



GE..LO – mounting dimensions

#### Technical Parameters:

Shaft diameter d	Bearing Code	Mass kg	Dimensions				
			d	D	B	C	dk
12	GE 12 LO <sup>2)4)</sup>	0.017	12+0.018	22–0.009	12–0.18	7–0.24	18
16	GE 16 LO <sup>4)5)</sup>	0.035	16+0.018	28–0.009	16–0.18	9–0.24	23
20	GE 20 LO <sup>5)</sup>	0.067	20+0.021	35–0.011	20–0.21	12–0.24	29
25	GE 25 LO	0.12	25+0.021	42–0.011	25–0.21	16–0.24	35.5
32	GE 32 LO	0.21	32+0.025	52–0.013	32–0.25	18–0.3	44
40	GE 40 LO	0.33	40+0.025	62–0.013	40–0.25	22–0.3	53
50	GE 50 LO	0.59	50+0.025	75–0.013	50–0.25	28–0.3	66
63	GE 63 LO	1.3	63+0.03	95–0.015	63–0.3	36–0.4	83
70	GE 70 LO <sup>3)6)</sup>	1.6	70+0.03	105–0.015	70–0.3	40–0.4	92
80	GE 80 LO	2.6	80+0.03	120–0.015	80–0.3	45–0.4	105
90	GE 90 LO <sup>3)6)</sup>	3	90+0.035	130–0.018	90–0.35	50–0.5	115
100	GE 100 LO	4,7	100+0.035	150–0.018	100–0.35	55–0.5	130
110	GE 110 LO <sup>3)</sup>	5,5	110+0.035	160–0.025	110–0.35	55–0.5	140
125	GE 125 LO	8,1	125+0.04	180–0.025	125–0.4	70–0.5	160
160	GE 160 LO <sup>6)</sup>	15,8	160+0.04	230–0.03	160–0.4	80–0.6	200
200	GE 200 LO <sup>6)</sup>	32,5	200+0.046	290–0.035	200–0.46	100–0.7	250
250	GE 250 LO <sup>6)</sup>	102	250+0.046	400–0.04	250–0.46	120–0.8	350
320	GE 320 LO <sup>6)</sup>	224	320+0.057	520–0.05	320–0.57	160–1	450

#### Remarks:

- 1) Bore tolerance: H7 (arithmetic mean value).
- 2) No relubrication facility.
- 3) Not included in ISO 12 240–1, dimension series W.
- 4) Cylindrical throughout.
- 5) No lubrication groove on inner ring spherical surface.
- 6) Price and delivery on request.
- 7) Also available in groups C2 and C3.

## Material

Made from high quality rolling bearing steel

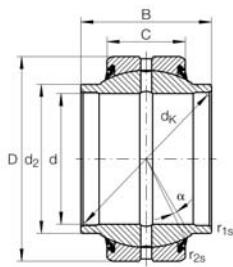
Sliding contact surface—Steel/steel

Dimensions		Chamfer dimensions		Mounting dimensions	Basic Load Rating		Radial internal clearance	Shaft diameter
$d_2 = d_a$ max	$\alpha$	$r_{1s}$	$r_{2s}$	$D_a$	dyn Cr	stat. Cor	CN	
	Degrees	min	min	max	N	N		
15.5	4	0.3	0.3	17.5	10 800	54 000	0.032–0.068	12
20	4	0.3	0.3	23	17 600	88 000	0.04–0.082	16
25	4	0.3	0.3	27.5	30 000	146 000	0.04–0.082	20
30	4	0.6	0.6	33	48 000	240 000	0.05–0.1	25
38	4	0.6	1	42	67 000	335 000	0.05–0.1	32
46	4	0.6	1	51	100 000	500 000	0.06–0.12	40
57	4	0.6	1	63	156 000	780 000	0.06–0.12	50
71.5	4	1	1	78	255 000	1 270 000	0.072–0.142	63
79	4	1	1	87	315 000	1 560 000	0.072–0.142	70
91	4	1	1	99	400 000	2 000 000	0.072–0.142	80
99	4	1	1	108	490 000	2 450 000	0.072–0.142	90
113	4	1	1	123	610 000	3 050 000	0.085–0.165	100
124	4	1	1	134	655 000	3 250 000	0.085–0.165	110
138	4	1	1	150	950 000	4 750 000	0.085–0.165	125
177	4	1	1	191	1 370 000	6 800 000	0.1–0.192	160
221	4	1.1	1.1	239	2 120 000	10 600 000	0.1–0.192	200
317	4	2.5	1.1	342	3 550 000	18 000 000	0.125–0.239	250
405	4	2.5	4	438	6 100 000	30 500 000	0.135–0.261	320

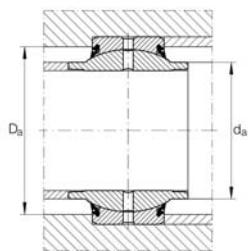
## Spherical Plain Bearings & Rod Ends

### Radial Spherical Plain Bearings

Metric(requiring maintenance)



GE..HO-2RS



GE..HO-2RS - mounting dimensions

#### Technical Parameters:

Shaft diameter d	Bearing Code	Mass kg	Dimensions				
			d	D	B	C	dk
20	GE 20 HO-2RS	0.069	20-0.01	35-0.011	24 ± 0.2	12-0.24	29 <sup>1)</sup>
25	GE 25 HO-2RS	0.12	25-0.01	42-0.011	29 ± 0.3	16-0.24	35.5
30	GE 30 HO-2RS	0.15	30-0.01	47-0.011	30 ± 0.3	18-0.24	40.7
35	GE 35 HO-2RS	0.26	35-0.012	55-0.013	35 ± 0.3	20-0.3	47
40	GE 40 HO-2RS	0.32	40-0.012	62-0.013	38 ± 0.3	22-0.3	53
45	GE 45 HO-2RS	0.43	45-0.012	68-0.013	40 ± 0.3	25-0.3	60
50	GE 50 HO-2RS	0.55	50-0.012	75-0.013	43 ± 0.3	28-0.3	66
60	GE 60 HO-2RS	1.1	60-0.015	90-0.015	54 ± 0.3	36-0.4	80
70	GE 70 HO-2RS	1.6	70-0.015	105-0.015	65 ± 0.3	40-0.4	92
80	GE 80 HO-2RS	2.5	80-0.015	120-0.015	74 ± 0.3	45-0.4	105

#### Remarks:

- 1) No lubrication groove on inner ring spherical surface.
- 2) Also available in groups C2 and C3.

## Material

Made from high quality rolling bearing steel

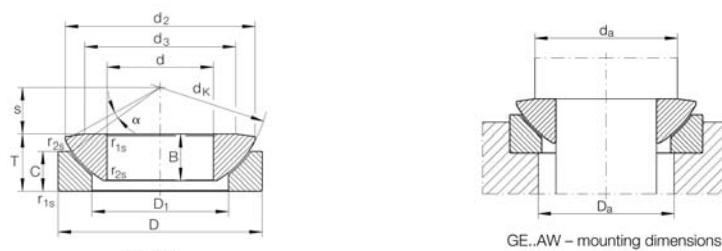
Sliding contact surface—Steel/steel

Dimensions		Chamfer dimensions		Mounting dimensions	Basic Load Rating		Radial internal clearance <sup>2)</sup>	Shaft diameter
$d_2 = d_a$ max	$\alpha$	$r_{1s}$	$r_{2s}$	$D_a$	dyn Cr	stat. Cor	CN	
mm	Degrees	min	min	max	N	N		
24	3	0.2	0.3	27.5	30 000	146 000	0.04–0.082	20
29	3	0.2	0.6	33	48 000	240 000	0.05–0.1	25
34.2	3	0.2	0.6	38	62 000	310 000	0.05–0.1	30
40	3	0.3	1	44.5	80 000	400 000	0.05–0.1	35
45	3	0.3	1	51	100 000	500 000	0.06–0.12	40
51.5	3	0.3	1	57	127 000	640 000	0.06–0.12	45
56.5	3	0.3	1	63	156 000	780 000	0.06–0.12	50
67.7	3	0.3	1	75	245 000	1220 000	0.06–0.12	60
78	3	0.3	1	87	315 000	1560 000	0.072–0.142	70
90	3	0.3	1	99	400 000	2000 000	0.072–0.142	80

## Spherical Plain Bearings & Rod Ends

### Radial Spherical Plain Bearings

Metric(Maintenance free)



#### Technical Parameters:

GE..AW

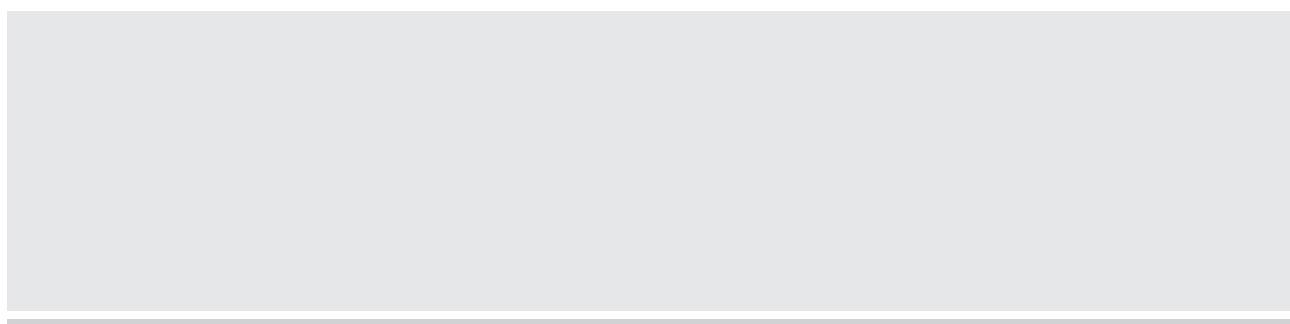
Shaft diameter d	Bearing Code	Mass kg	Dimensions						
			d	D	T	dk	d2	d3	D1
10	GE 10 AW <sup>1)</sup>	0.038	10–0.008	30–0.009	9.5–0.4	32	27.5	21	16.5
12	GE 12 AW <sup>1)</sup>	0.07	12–0.008	35–0.011	13–0.4	37	32	24	19.5
15	GE 15 AW <sup>1)</sup>	0.12	15–0.008	42–0.011	15–0.4	45	38.9	29	24
17	GE 17 AW	0.16	17–0.008	47–0.011	16–0.4	50	43.4	34	28
20	GE 20 AW	0.26	20–0.01	55–0.013	20–0.4	60	50	40	33.5
25	GE 25 AW	0.39	25–0.01	62–0.013	22.5–0.4	66	57.5	45	34.5
30	GE 30 AW	0.65	30–0.01	75–0.013	26–0.4	80	69	56	44
35	GE 35 AW	1	35–0.012	90–0.015	28–0.4	98	84	66	52
40	GE 40 AW	1.6	40–0.012	105–0.015	32–0.4	114	98	78	59
45	GE 45 AW	2.5	45–0.012	120–0.015	36.5–0.4	130	112	89	68
50	GE 50 AW	3.4	50–0.012	130–0.018	42.5–0.4	140	122.5	98	69
60	GE 60 AW	4.7	60–0.015	150–0.018	45–0.4	160	140	108	86
70	GE 70 AW	5.7	70–0.015	160–0.025	50–0.4	170	149.5	121	95
80	GE 80 AW	7.2	80–0.015	180–0.025	50–0.4	194	168	130	108
100	GE 100 AW	10.9	100–0.02	210–0.03	59–0.4	220	195.5	155	133
120	GE 120 AW	13	120–0.02	230–0.03	64–0.4	245	214	170	154
140	GE 140 AW	18.3	140–0.025	260–0.035	72–0.5	272	244	198	176
160	GE 160 AW	23.8	160–0.025	290–0.035	77–0.5	310	272	213	199
180	GE 180 AW	31.5	180–0.025	320–0.04	86–0.5	335	300	240	224
200	GE 200 AW	34.7	200–0.03	340–0.04	87–0.6	358	321	265	246
220	GE 220 AW	44.7	220–0.03	370–0.04	97–0.6	388	350	289	265
240	GE 240 AW	56.9	240–0.03	400–0.04	103–0.6	420	382	314	294
260	GE 260 AW	71.3	260–0.035	430–0.045	115–0.7	449	409	336	317
280	GE 280 AW	84	280–0.035	460–0.045	110–0.7	480	445	366	337
300	GE 300 AW	88.5	300–0.035	480–0.045	110–0.7	490	460	388	356
320	GE 320 AW	111	320–0.04	520–0.05	116–0.8	540	500	405	380
340	GE 340 AW	117	340–0.04	540–0.05	116–0.8	550	510	432	380
360	GE 360 AW	132	360–0.04	560–0.05	125–0.8	575	535	452	400

## Material

Race—Alloy steel, heat treated, PTFE liner

Ball— Hardened rolling bearing steel, spherical surface ground,  
polished and hard chromium plated.

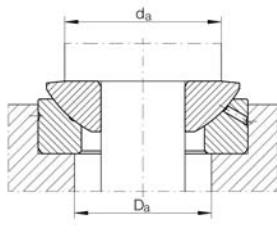
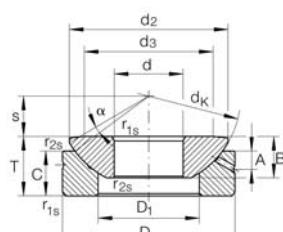
Dimensions				Chamfer dimensions		Mounting dimensions		Basic Load Rating		Shaft diameter
B	C	s	$\alpha$	r <sub>1s</sub>	r <sub>2s</sub>	d <sub>a</sub>	D <sub>a</sub>	dyn Cr	stat. Cor	
		Degrees		min	min	max	max	N	N	d
7.9–0.24	6–0.24	7	10	0.6	0.2	21	18.5	73 200	122 000	10
9.3–0.24	9–0.24	8	9	0.6	0.2	24	21.5	97 200	162 000	12
10.7–0.24	11–0.24	10	7	0.6	0.2	29	26	156 000	261 000	15
11.5–0.24	11.5–0.24	11	6	0.6	0.2	34	30.5	177 000	296 000	17
14.3–0.24	13–0.24	12.5	6	1	0.3	40	38	225 000	375 000	20
16–0.24	17–0.24	14	7	1	0.3	45	39	387 000	645 000	25
18–0.24	19.5–0.24	17.5	6	1	0.3	56	49	508 000	848 000	30
22–0.24	20–0.24	22	6	1	0.3	66	57	777 000	1 290 000	35
27–0.24	22–0.24	24.5	6	1	0.3	78	64	1 120 000	1 860 000	40
31–0.24	25–0.24	27.5	6	1	0.3	89	74	1 450 000	2 430 000	45
33.5–0.24	32–0.24	30	5	1	0.3	98	75	1 950 000	3 250 000	50
37–0.3	33–0.3	35	7	1	0.3	108	92	2 200 000	3 670 000	60
40–0.3	36–0.3	35	6	1	0.3	121	102	2 420 000	4 030 000	70
42–0.3	36–0.3	42.5	6	1	0.3	130	115	3 110 000	5 180 000	80
50–0.4	42–0.4	45	7	1	0.3	155	141	3 610 000	6 020 000	100
52–0.4	45–0.4	52.5	8	1	0.3	170	162	3 730 000	6 220 000	120
61–0.5	50–0.5	52.5	6	1.5	0.6	198	187	4 900 000	8 170 000	140
65–0.5	52–0.5	65	7	1.5	0.6	213	211	5 670 000	9 460 000	160
70–0.5	60–0.5	67.5	8	1.5	0.6	240	236	6 380 000	10 630 000	180
74–0.6	60–0.6	70	8	1.5	0.6	265	259	7 070 000	11 780 000	200
82–0.6	67–0.6	75	7	1.5	0.6	289	279	8 530 000	14 220 000	220
87–0.6	73–0.6	77.5	6	1.5	0.6	314	309	10 300 000	17 170 000	240
95–0.7	80–0.7	82.5	7	1.5	0.6	336	332	10 810 000	18 010 000	260
100–0.7	85–0.7	80	4	3	1	366	355	17 130 000	28 560 000	280
100–0.7	90–0.7	80	3.5	3	1	388	375	17 280 000	28 800 000	300
105–0.8	91–0.8	95	4	4	1.1	405	402	21 110 000	35 180 000	320
105–0.8	91–0.8	95	4	4	1.1	432	402	23 670 000	39 460 000	340
115–0.8	95–0.8	95	4	4	1.1	452	422	25 470 000	42 460 000	360



## Spherical Plain Bearings & Rod Ends

### Radial Spherical Plain Bearings

Metric(requiring maintenance)



GE..AX – mounting dimensions

#### Technical Parameters:

GE..AX

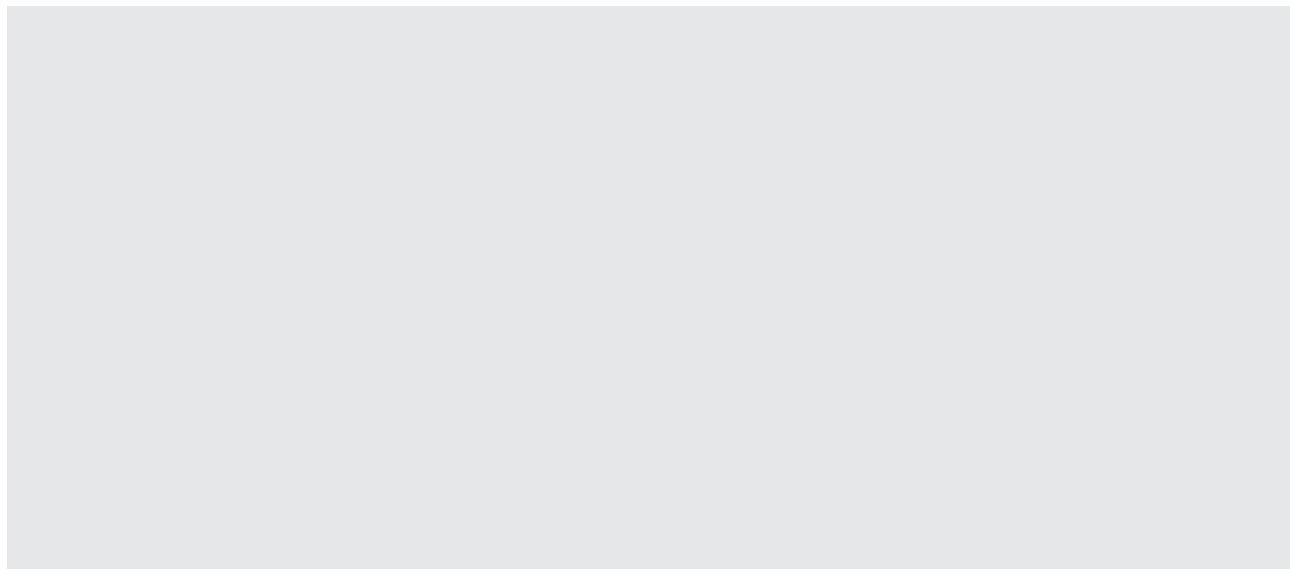
Shaft diameter d	Bearing Code	Mass kg	Dimensions							
			d	D	T	dk	d <sub>2</sub>	d <sub>3</sub>	D <sub>1</sub>	B
10	GE 10 AX	0.039	10–0.008	30–0.009	9.5–0.4	32	27.5	21	16.5	7.9–0.24
12	GE 12 AX	0.071	12–0.008	35–0.011	13–0.4	37	32	24	19.5	9.3–0.24
15	GE 15 AX	0.12	15–0.008	42–0.011	15–0.4	45	38.9	29	24	10.7–0.24
17	GE 17 AX	0.16	17–0.008	47–0.011	16–0.4	50	43.4	34	28	11.5–0.24
20	GE 20 AX	0.26	20–0.01	55–0.013	20–0.4	60	50	40	33.5	14.3–0.24
25	GE 25 AX	0.39	25–0.01	62–0.013	22.5–0.4	66	57.5	45	34.5	16–0.24
30	GE 30 AX	0.65	30–0.01	75–0.013	26–0.4	80	69	56	44	18–0.24
35	GE 35 AX	1	35–0.012	90–0.015	28–0.4	98	84	66	52	22–0.24
40	GE 40 AX	1.7	40–0.012	105–0.015	32–0.4	114	98	78	59	27–0.24
45	GE 45 AX	2.5	45–0.012	120–0.015	36.5–0.4	130	112	89	68	31–0.24
50	GE 50 AX1)	3.4	50–0.012	130–0.018	42.5–0.4	140	122.5	98	69	33.5–0.24
60	GE 60 AX1)	4.7	60–0.015	150–0.018	45–0.4	160	140	108	86	37–0.3
70	GE 70 AX1)	5.7	70–0.015	160–0.025	50–0.4	170	149.5	121	95	40–0.3
80	GE 80 AX1)	7.2	80–0.015	180–0.025	50–0.4	194	168	130	108	42–0.3
100	GE 100 AX1)	10.9	100–0.02	210–0.03	59–0.4	220	195.5	155	133	50–0.4
120	GE 120 AX1)	13	120–0.02	230–0.03	64–0.4	245	214	170	154	52–0.4
140	GE 140 AX1)	18.6	140–0.025	260–0.035	72–0.5	272	244	198	176	61–0.5
160	GE 160 AX1)	23.9	160–0.025	290–0.035	77–0.5	310	272	213	199	65–0.5
180	GE 180 AX1)	31.6	180–0.025	320–0.040	86–0.5	335	300	240	224	70–0.5
200	GE 200 AX1)	35	200–0.03	340–0.040	87–0.5	358	321	265	246	74–0.6

## Material

Made from high quality rolling bearing steel

Sliding contact surface—Steel/steel

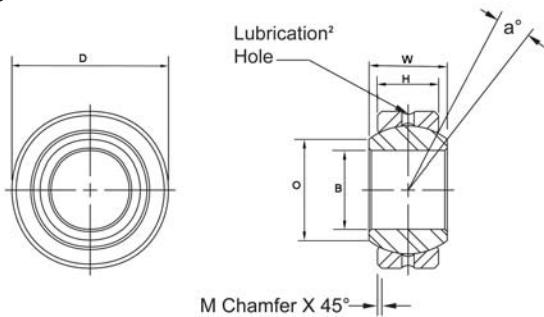
C	Dimensions				Chamfer dimensions		Mounting dimensions		Basic Load Rating		Shaft diameter d
	s	A	$\alpha$		r <sub>1s</sub>	r <sub>2s</sub>	d <sub>a</sub>	D <sub>a</sub>	dyn Cr	stat. Cor	
	mm		Degrees		min	min	max	max	N	N	
6–0.24	7	3	10	0.6	0.2	21	18.5	24 400	122 000	10	
9–0.24	8	4	9	0.6	0.2	24	21.5	32 400	162 000	12	
11–0.24	10	5	7	0.6	0.2	29	26	52 200	261 000	15	
11.5–0.24	11	5	6	0.6	0.2	34	30.5	59 200	296 000	17	
13–0.24	12.5	6	6	1	0.3	40	38	75 100	375 000	20	
17–0.24	14	6	7	1	0.3	45	39	129 000	645 000	25	
19.5–0.24	17.5	8	6	1	0.3	56	49	169 000	848 000	30	
20–0.24	22	8	6	1	0.3	66	57	259 000	1 290 000	35	
22–0.24	24.5	9	6	1	0.3	78	64	373 000	1 860 000	40	
25–0.24	27.5	11	6	1	0.3	89	74	486 000	2 430 000	45	
32–0.24	30	10	5	1	0.3	98	75	650 000	3 250 000	50	
33–0.3	35	12.5	7	1	0.3	108	92	735 000	3 670 000	60	
36–0.3	35	13.5	6	1	0.3	121	102	806 000	4 030 000	70	
36–0.3	42.5	14.5	6	1	0.3	130	115	1 030 000	5 180 000	80	
42–0.4	45	15	7	1	0.3	155	141	1 200 000	6 020 000	100	
45–0.4	52.5	16.5	8	1	0.3	170	162	1 240 000	6 220 000	120	
50–0.5	52.5	23	6	1.5	0.6	198	187	1 630 000	8 170 000	140	
52–0.5	65	23	7	1.5	0.6	213	211	1 890 000	9 460 000	160	
60–0.5	67.5	26	8	1.5	0.6	240	236	2 120 000	10 630 000	180	
60–0.6	70	27	8	1.5	0.6	265	259	2 350 000	11 780 000	200	



## Spherical Plain Bearings & Rod Ends

### Radial Spherical Plain Bearings

Inch(Maintenance-free)



#### Technical Parameters:

Bearing Code	Dimensions			
	B +.0015 -.0005	D +.0000 -.0007	H +/- .005	W +/- .005
	inches			
COM-3	0.1900	0.5625	0.218	0.281
COM-4	0.2500	0.6562	0.250	0.343
COM-5	0.3125	0.7500	0.281	0.375
COM-6	0.3750	0.8125	0.312	0.406
COM-7	0.4375	0.9062	0.343	0.437
COM-8	0.5000	1.0000	0.390	0.500
COM-9	0.5625	1.0937	0.437	0.562
COM-10	0.6250	1.1875	0.500	0.625
COM-12	0.7500	1.4375	0.593	0.750
COM-14	0.8750	1.5625	0.703	0.875
*COM-16	1.0000	1.7500	0.797	1.000
*HCOM-19	1.1875	2.3750	0.937	1.187
*HCOM-16	1.0000	2.0000	0.781	1.000
*HCOM-20	1.2500	2.3750	0.937	1.187
*HCOM-24	1.5000	2.7500	1.094	1.375
*HCOM-28	1.7500	3.1250	1.250	1.562
*HCOM-32	2.0000	3.5000	1.375	1.750

#### Remarks:

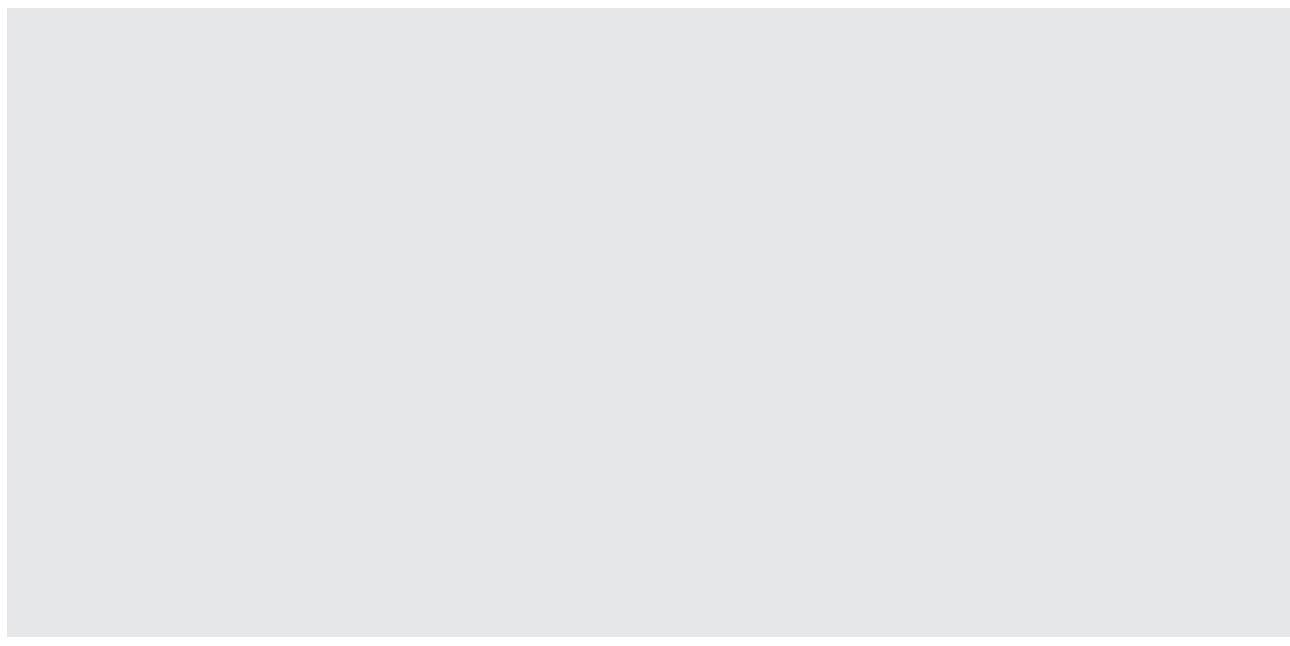
1. \* Bore tolerance on these items is as follows: INCH: +.0025, -.0005; METRIC: +.064, -.013
2. PTFE Liners use suffix T e.g. COM-10T
3. PTFE Liners have no lubrication holes or groove in race

## Material

**Race**—Carbon steel, I.D. protective coated for corrosion resistance.

**Ball**—Hardened and ground rolling bearing chromium steel

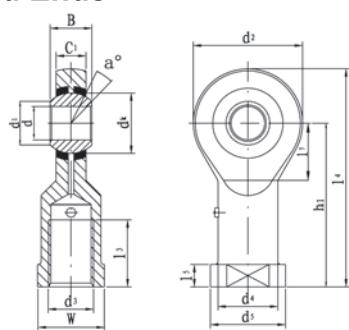
Flat Dia. Ref.	Chamfer Ref.	Ball Dia. Ref.	Misalign. Angle	Radial Static Load Rating	Mass		
					$\alpha$		
			inches	degrees	Lbs.	lbs.	g
0.293	0.015	0.406	11	3250	0.014	6	
0.364	0.022	0.500	13.5	4950	0.022	10	
0.419	0.032	0.562	12	6475	0.030	14	
0.516	0.032	0.656	10	8400	0.038	17	
0.530	0.032	0.687	8	9453	0.047	21	
0.640	0.032	0.813	9.5	13250	0.065	29	
0.710	0.032	0.906	9.5	16630	0.086	39	
0.780	0.032	1.000	8.5	21280	0.110	50	
0.920	0.044	1.187	9	31920	0.204	93	
0.980	0.044	1.312	9.5	41960	0.263	119	
1.118	0.044	1.500	10	55200	0.386	175	
1.610	0.032	2.000	8.5	100730	0.895	251	
1.360	0.032	1.687	9	70820	0.553	406	
1.610	0.032	2.000	8.5	100730	0.895	406	
1.860	0.032	2.312	8.5	135950	1.358	616	
2.110	0.044	2.625	8	176370	1.948	884	
2.360	0.044	2.937	8.5	217060	2.650	1198	



## Spherical Plain Bearings & Rod Ends

### Female Rod Ends

Metric (requiring maintenance)



### Technical Parameters:

PHS

Bearing Code	Dimensions							
	d	Thread G	d <sub>2</sub>	C <sub>1</sub>	B	d <sub>1</sub>	l <sub>4</sub>	h <sub>1</sub>
mm								
PHS 3	3	M 3	12	4.5	6	5.2	27	21
PHS 4	4	M 4	14	5.3	7	6.5	31	24
PHS 5	5	M 5	16	6	8	7.7	35	27
PHS 6	6	M 6	18	6.75	9	9	39	30
PHS 8	8	M8	22	9	12	10.4	47	36
PHS 10	10	M10	26	10.5	14	12.9	56	43
PHS 12	12	M12	30	12	16	15.4	65	50
PHS 14	14	M14	34	13.5	19	16.9	74	57
PHS 16	16	M16	38	15	21	19.4	83	64
PHS 18	18	M18x1.5	42	16.5	23	21.9	92	71
PHS 20	20	M20x1.5	46	18	25	24.4	100	77
PHS 22	22	M22x1.5	50	20	28	25.8	109	84
PHS 25	25	M24x2	60	22	31	29.6	124	94
PHS 28	28	M27x2	66	25	35	32.3	136	103
PHS 30	30	M30x2	70	25	37	34.8	145	110

Note1) Minimum allowable value of chamfer dimension  $r_1$

Remarks:

- 1.Bearing with a stretching rod, stretching rod with right or left-hand female thread.  
For left-hand thread, suffix "L" is added to bearing code and thread sign, e.g. PHS10L-6H
- 2.The sliding surface with a bronze liner.
- 3.To plate zinc on the surface of rod body, the housing ring with a lubrication hole or a grease nipple.

## Material

Bushing– special copper alloy

Body– Zinc chromate plated

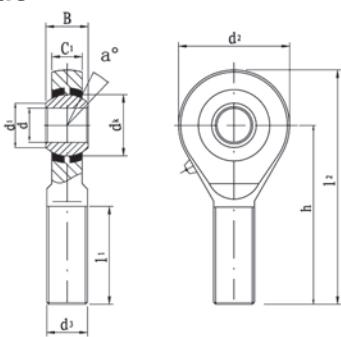
Spherical inner ring–Chromium plated

Dimensions						Basic Load Rating		Mass
$l_3$	$l_5$	W	$d_3$	$d_L$	$r_{1s\ min}^{-1}$	Dyn.	Stat.	
mm						N		kg
10	3	5.5	5	6.5	0.3	1750	3670	0.006
12	4	8	8	9.5	0.3	2480	4680	0.012
14	4	9	9	11	0.3	3270	5730	0.016
14	5	11	10	13	0.3	4200	6910	0.022
17	5	14	12.5	16	0.3	7010	10200	0.047
21	6.5	17	15	19	0.3	9810	13300	0.077
24	6.5	19	17.5	22	0.3	13100	16900	0.10
27	8	22	20	25	0.6	16800	20900	0.16
33	8	22	22	27	0.6	21000	25400	0.22
36	10	27	25	31	0.6	25700	30200	0.32
40	10	30	27.5	34	0.6	30800	35500	0.42
43	12	32	30	37	0.6	37400	41700	0.54
48	12	36	33.5	42	1	46200	72700	0.73
53	12	41	37	46	1	58400	87000	0.98
56	15	41	40	50	1	62300	92200	1.10

## Spherical Plain Bearings & Rod Ends

### Male Rod Ends

Metric (requiring maintenance)



POS

Bearing Code	Dimensions					
	d	Thread G	d <sub>2</sub>	C <sub>1</sub>	B	d <sub>1</sub>
mm						
POS3	3	M 3	12	4.5	6	5.2
POS4	4	M 4	14	5.3	7	6.5
POS5	5	M 5	16	6	8	7.7
POS6	6	M 6	18	6.75	9	8
POS8	8	M8	22	9	12	10.4
POS10	10	M10	26	10.5	14	12.9
POS12	12	M12	30	12	16	15.4
POS14	14	M14	34	13.5	19	16.9
POS16	16	M16	38	15	21	19.4
POS18	18	M18x1.5	42	16.5	23	21.9
POS20	20	M20x1.5	46	18	25	24.4
POS22	22	M22x1..5	50	20	28	25.8
POS25	25	M24x2	60	22	31	29.6
POS28	28	M27x2	66	25	35	32.3
POS30	30	M30x2	70	25	37	34.8

Note1) Minimum allowable value of chamfer dimension r<sub>1</sub>

Remarks:

- 1.Bearing with a stretching rod, stretching rod with right or left-hand female thread.  
For left-hand thread, suffix "L" is added to bearing code and thread sign, e.g. PHSL10L-6H
- 2.The sliding surface with a bronze liner.
- 3.To plate zinc on the surface of rod body, the housing ring with a lubrication hole or a grease nipple.

## Material

Bushing– special copper alloy

Body– Zinc chromate plated

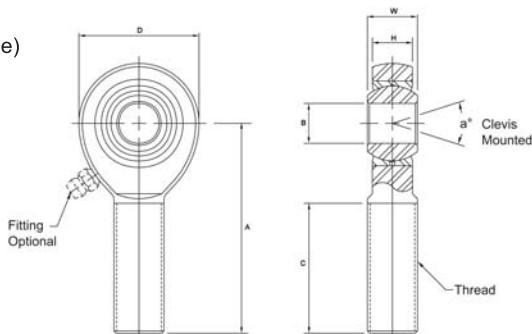
Spherical inner ring–Chromium plated

Dimensions				Basic Load Rating		Mass
L <sub>2</sub>	h	l <sub>1</sub>	r <sub>1s min<sup>1</sup></sub>	Dyn.	Stat.	
mm				N		kg
33	27	15	0.3	1750	1220	0.005
37	30	17	0.3	2480	2060	0.008
41	33	20	0.3	3270	3340	0.013
45	36	22	0.3	4200	4730	0.020
53	42	25	0.3	7010	8640	0.030
61	48	29	0.3	9810	13300	0.055
69	54	33	0.3	13100	16900	0.085
77	60	36	0.6	16800	20900	0.14
85	66	40	0.6	21000	25400	0.21
93	72	47	0.6	25700	30200	0.28
101	78		0.6	30800	35500	0.38
109	84	51	0.6	37400	41700	0.48
124	94	57	1	46200	72700	0.64
136	103	62	1	58400	87000	0.96
145	110	66	1	62300	92200	1.10

## Spherical Plain Bearings & Rod Ends

### Male Rod Ends

Inch-Extra Strength - Heavy Duty Shank (Maintenance-free)



#### Technical Parameters:

Bearing Code		Dimensions					
		B +.0015 -.0005	W +.000 -.005	H +/- .005	A +/- .015	D +/- .010	C +.062 -.031
inches							
XM-3	XB-3	0.1900	0.312	0.250	1.562	0.750	1.000
XM-4	XB-4	0.2500	0.375	0.281	1.875	0.875	1.250
XM-5	XB-5	0.3125	0.437	0.344	1.938	1.000	1.250
XM-6	XB-6	0.3750	0.500	0.406	2.125	1.125	1.375
XM-7	XB-7	0.4375	0.562	0.437	2.438	1.312	1.500
XM-8	XB-8	0.5000	0.625	0.500	2.625	1.500	1.625
XM-10	XB-10	0.6250	0.750	0.562	2.875	1.750	1.750
XM-12	XB-12	0.7500	0.875	0.687	3.375	2.000	1.875
XM-12-1	XB-12-1	0.7500	0.875	0.687	3.375	2.000	1.875
XM-14-1	XB-14-1	0.8750	0.875	0.687	3.375	2.000	1.875

## Material

**Body**— Carbon steel, protective coated for corrosion resistance.

**Race**— Alloy steel, heat treated protective coated for corrosion resistance.(Carbon steel with PTFE liners.)

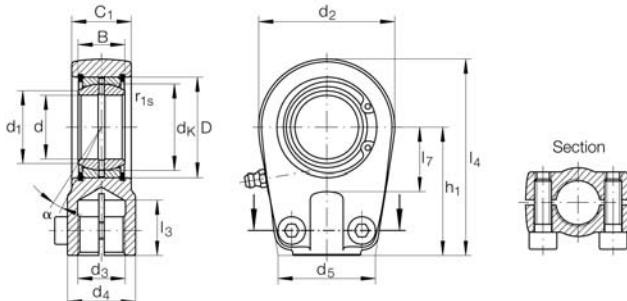
**Ball**—Alloy steel, heat treated, hard chromium

Ball Dia.	Thread UNF-3A	Misalign. Angle	Radial Static Load Rating	Mass			
				Ref.	$\alpha$		
				degrees	Lbs.	Ibs.	g
0.437	1/4-28	10	2158	0.043	20		
0.500	5/16-24	13	3467	0.072	33		
0.625	3/8-24	12	5323	0.112	51		
0.719	7/16-20	10	7180	0.160	73		
0.812	1/2-20	12	9620	0.249	113		
0.937	5/8-18	10	12807	0.382	173		
1.125	3/4-16	13	16565	0.602	273		
1.312	7/8-14	12	22803	0.918	427		
1.312	3/4-16	12	22803	0.918	427		
1.312	7/8-14	12	22803	0.918	427		

## Spherical Plain Bearings & Rod Ends

### Hydraulic Rod Ends

Metric(requiring maintenance)



#### Technical Parameters:

GIHR-K..DO ( $d \leq 50$  mm)

Shaft diameter d	Bearing Code <sup>1)</sup>	Mass	Dimensions								
			d	D	B	dk	d1	d2	d3	d4	h1
		kg	mm								
20	GIHR-K 20 DO	0.43	20–0.01	35	16–0.12	29	24.1	56	M16x1.5	25	50
25	GIHR-K 25 DO	0.48	25–0.01	42	20–0.12	35.5	29.3	56	M16x1.5	25	50
30	GIHR-K 30 DO	0.74	30–0.01	47	22–0.12	40.7	34.2	64	M22x1.5	32	60
35	GIHR-K 35 DO	1.2	35–0.012	55	25–0.12	47	39.7	78	M28x1.5	40	70
40	GIHR-K 40 DO	2	40–0.012	62	28–0.12	53	45	94	M35x1.5	49	85
50	GIHR-K 50 DO	3.8	50–0.012	75	35–0.12	66	55.9	116	M45x1.5	61	105
60	GIHR-K 60 DO	5.4	60–0.015	90	44–0.15	80	66.8	130	M58x1.5	75	130
70	GIHR-K 70 DO	8.5	70–0.015	105	49–0.15	92	77.8	154	M65x1.5	86	150
80	GIHR-K 80 DO	12	80–0.015	120	55–0.15	105	89.4	176	M80x2	102	170
90	GIHR-K 90 DO	21.5	90–0.02	130	60–0.2	115	98.1	206	M100x2	124	210
100	GIHR-K 100 DO	27.5	100–0.02	150	70–0.2	130	109.5	230	M110x2	138	235
110	GIHR-K 110 DO	40.5	110–0.02	160	70–0.2	140	121.2	265	M120x3	152	265
120	GIHR-K 120 DO	76	120–0.02	180	85–0.2	160	135.5	340	M130x3	172	310

#### Remarks:

- 1) These hydraulic rod ends are also available with maintenance-free spherical plain bearings GE..UK, GE..UK–2RS, GE..FW, GE..FW–2RS.
- 2) Basic load rating of housing.
- 3) Bearing with a stretching rod, stretching rod with right or left-hand female thread.  
For left-hand thread, suffix "L" is added to bearing number and thread sign, e.g. GIHL-K30DO M22 X 1.5L–6H
- 4) The housing with a lubrication hole or a grease nipple.

## Material

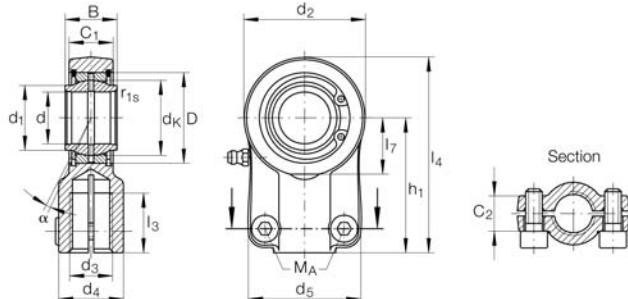
Sliding contact surface—Alloy steel, heat treated

Dimensions						Basic Load Rating		Radial internal clearance	Fixing screws	Tightening torque	Shaft diameter
$\alpha$	$l_3$	$l_4$	$l_7$	$d_5$	$C_1$	Dyn Cr	Stat. Cor <sup>2)</sup>	CN		M <sub>A</sub>	d
degrees	mm					N					mm
9	17	78	25	41	19	30 000	81 100	0.030 – 0.082	M8x20	32	20
7	17	78	25	41	23	48 000	65 400	0.037 – 0.1	M8x25	32	25
6	23	92	30	46	28	62 000	96 700	0.037 – 0.1	M8x25	32	30
6	29	109	38	58	30	80 000	140 000	0.037 – 0.1	M10x30	64	35
7	36	132	45	66	35	100 000	227 000	0.043 – 0.12	M10x35	64	40
6	46	163	55	88	40	156 000	333 000	0.043 – 0.12	M12x35	110	50
6	59	200	65	90	50	245 000	326 000	0.043 – 0.12	M10x45	46	60
6	66	232	75	100	55	315 000	440 000	0.055 – 0.142	M12x50	80	70
6	81	265	80	125	60	400 000	550 000	0.055 – 0.142	M16x50	195	80
5	101	323	90	146	65	490 000	810 000	0.055 – 0.142	M16x60	195	90
7	111	360	105	166	70	610 000	920 000	0.065 – 0.165	M20x60	385	100
6	125	407.5	115	190	80	655 000	1382 000	0.065 – 0.165	M20x70	385	110
6	135	490	140	217	90	950 000	2373 000	0.065 – 0.165	M24x80	660	120

## Spherical Plain Bearings & Rod Ends

### Hydraulic Rod Ends

Metric(requiring maintenance)



#### Technical Parameters:

GIHN-K..LO ( $d \leq 50$  mm)

Shaft diameter d	Bearing Code <sup>1)</sup>	Mass		Dimensions								
		kg	d <sup>2)</sup>	D	B	d <sub>k</sub>	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	h <sub>1</sub>	C <sub>1</sub>
		mm										
12	GIHN-K 12 LO <sup>2)4)</sup>	0.1	12+0.018	22	12–0.18	18	15.5	32	M12x1.25	16.5	38	10.6
16	GIHN-K 16 LO <sup>4)</sup>	0.2	16+0.018	28	16–0.18	23	20	40	M14x1.5	21	44	13
20	GIHN-K 20 LO	0.4	20+0.021	35	20–0.21	29	25	47	M16x1.5	25	52	17
25	GIHN-K 25 LO	0.66	25+0.021	42	25–0.21	35,5	30,5	58	M20x1.5	30	65	21
32	GIHN-K 32 LO	1.2	32+0.025	52	32–0.25	44	38	70	M27x2	38	80	27
40	GIHN-K 40 LO	2.1	40+0.025	62	40–0.25	53	46	89	M33x2	47	97	32
50	GIHN-K 50 LO	4.4	50+0.025	75	50–0.25	66	57	108	M42x2	58	120	40
63	GIHN-K 63 LO	7,6	63+0.03	95	63–0.3	83	71,5	132	M48x2	70	140	52
70	GIHN-K 70 LO <sup>3)</sup>	9,5	70+0.03	105	70–0.3	92	79	155	M56x2	80	160	57
80	GIHN-K 80 LO	14,5	80+0.03	120	80–0.3	105	91	168	M64x3	90	180	66
90	GIHN-K 90 LO <sup>3)</sup>	17	90+0.035	130	90–0.35	115	99	185	M72x3	100	195	72
100	GIHN-K 100 LO	28	100+0.035	150	100–0.35	130	113	210	M80x3	110	210	84
110	GIHN-K 110 LO <sup>3)</sup>	32	110+0.035	160	110–0.35	140	124	235	M90x3	125	235	88
125	GIHN-K 125 LO	43	125+0.04	180	125–0.4	160	138	262	M100x3	135	260	102
160	GIHN-K 160 LO <sup>3)</sup>	80	160+0.04	230	160–0.4	200	177	326	M125x4	165	310	130
200	GIHN-K 200 LO <sup>3)</sup>	165	200+0.046	290	200–0.46	250	221	418	M160x4	215	390	162

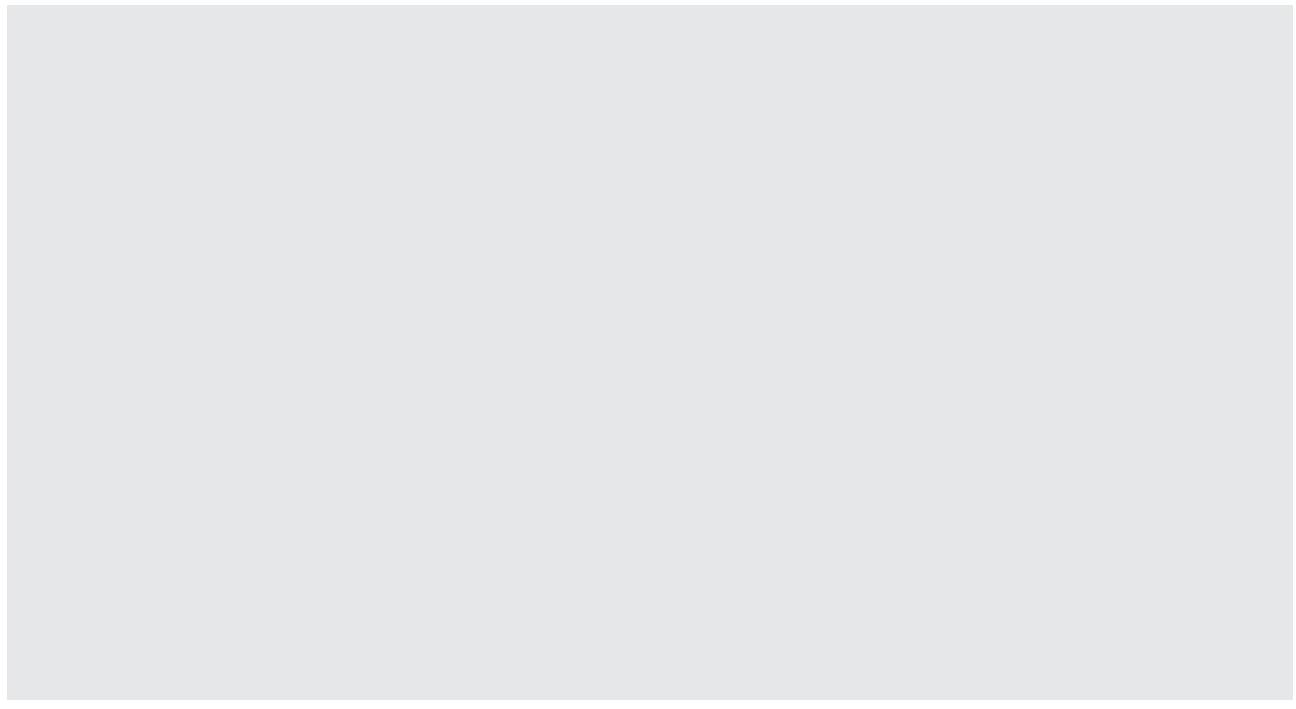
#### Remarks:

- 1) Bore tolerance: H7 (arithmetic mean value).
- 2) No relubrication facility.
- 3) Not included in DIN 24 338.
- 4) Cylindrical throughout.
- 5) Basic load rating of housing.

## Material

Sliding contact surface—Alloy steel, heat treated

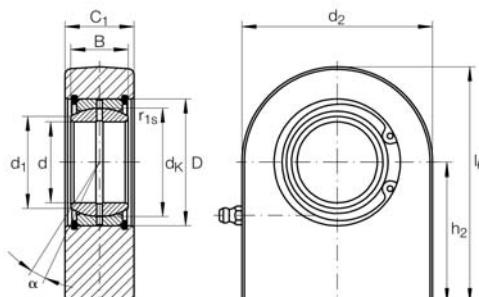
Dimensions						Basic Load Rating		Radial internal clearance	Nominal cylinder force	Fixing screws	Tightening torque	Shaft diameter
$\alpha$	$l_3$	$l_4$	$l_7$	$d_5$	$C_2$	Dyn Cr	Stat. Cor <sup>5)</sup>	CN			M <sub>A</sub>	d
degrees	mm			N			KN					mm
4	17	54	14	32	10.6	10 800	24 000	0.023– 0.068	8	M5 x12	8	12
4	19	64	18	40	13	17 600	35 300	0.030 – 0.082	12.5	M6 x 16	13	16
4	23	75.2	22	47	17	30 000	41 400	0.030 – 0.082	20	M8 x 20	32	20
4	29	94	27	54	17	48 000	69 900	0.037 – 0.1	32	M8 x 20	32	25
4	37	115	32	66	22	67 000	98 800	0.037 – 0.1	50	M10 x 25	64	32
4	46	141.5	41	80	26	100 000	175 000	0.043 – 0.12	80	M10 x 25	64	40
4	57	174	50	96	32	156 000	268 000	0.043 – 0.12	125	M12 x 30	110	50
4	64	211	62	114	38	255 000	320 000	0.055 – 0.142	200	M12 x 35	80	63
4	76	245	70	135	42	315 000	475 000	0.055 – 0.142	250	M16 x 40	195	70
4	86	270	78	148	48	400 000	527 000	0.055 – 0.142	320	M16 x 45	195	80
4	91	296	85	160	52	490 000	660 000	0.055 – 0.142	400	M16 x 50	195	90
4	96	322	98	178	62	610 000	840 000	0.065 – 0.165	500	M20 x 60	385	100
4	106	364	105	190	62	655 000	1100 000	0.065 – 0.165	635	M20 x 60	385	110
4	113	405	120	200	72	950 000	1393 000	0.065 – 0.165	800	M20 x 70	385	125
4	126	488	150	250	82	1370 000	2080 000	0.065 – 0.192	1250	M24 x 80	660	160
4	161	620	195	320	102	2120 000	3456 000	0.065 – 0.192	2000	M30 x 100	1350	200



## Spherical Plain Bearings & Rod Ends

### Hydraulic Rod Ends

Metric(requiring maintenance)



#### Technical Parameters:

GF..DO

Shaft diameter d mm	Bearing Code	Mass kg	Dimensions mm						
			d	D	B	dk	d1	d2	h2
20	GF 20 DO	0.35	20-0.01	35	16-0.12	29	24.1	50	38
25	GF 25 DO	0.53	25-0.01	42	20-0.12	35.5	29.3	55	45
30	GF 30 DO	0.87	30-0.01	47	22-0.12	40.7	34.2	65	51
35	GF 35 DO	1.5	35-0.012	55	25-0.12	47	39.7	83	61
40	GF 40 DO	2.4	40-0.012	62	28-0.12	53	45	100	69
45	GF 45 DO	3.4	45-0.012	68	32-0.12	60	50.7	110	77
50	GF 50 DO	4.4	50-0.012	75	35-0.12	66	55.9	123	88
60	GF 60 DO	7.1	60-0.015	90	44-0.15	80	66.8	140	100
70	GF 70 DO	10.5	70-0.015	105	49-0.15	92	77.8	164	115
80	GF 80 DO	15	80-0.015	120	55-0.15	105	89.4	180	141
90	GF 90 DO <sup>2)</sup>	23.5	90-0.02	130	60-0.2	115	98.1	226	150
100	GF 100 DO <sup>2)</sup>	31.5	100-0.02	150	70-0.2	130	109.5	250	170
110	GF 110 DO <sup>2)</sup>	48	110-0.02	160	70-0.2	140	121.2	295	185
120	GF 120 DO <sup>2)</sup>	79	120-0.02	180	85-0.2	160	135.5	360	210

#### Remarks:

- 1)Type GF...DO is made up of a spherical plain bearing of type GE...DO and housing with a rectangle welding face.
- 2)We can manufacture a spherical plain bearing with two seals and rod body, e.g. GF70DO-2RS

## Material

Drop forged construction steel, surfaces preserved.

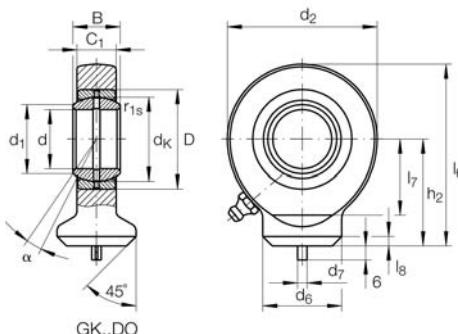
Sliding contact surface: Steel/steel

C <sub>1</sub> nominal	C <sub>1</sub> max	Dimensions		Chamfer dimensions r <sub>1s</sub>	Basic Load Rating		Radial internal clearance CN	Shaft diameter d
		mm	degrees		mm	min		
19	20	9	63	0.3	30 000	65 500	0.030 – 0.082	20
23	24	7	72.5	0.6	48 000	68 700	0.037 – 0.1	25
28	29	6	83.5	0.6	62 000	115 000	0.037 – 0.1	30
30	31	6	102.5	0.6	80 000	193 000	0.037 – 0.1	35
35	36.5	7	119	0.6	100 000	305 000	0.043 – 0.12	40
40	41.5	7	132	0.6	127 000	386 000	0.043 – 0.12	45
40	41.5	6	149.5	0.6	156 000	441 000	0.043 – 0.12	50
50	52.5	6	170	1	245 000	558 000	0.043 – 0.12	60
55	58	6	197	1	315 000	724 000	0.055 – 0.142	70
60	63	6	231	1	400 000	804 000	0.055 – 0.142	80
65	69	5	263	1	490 000	1 352 000	0.055 – 0.142	90
70	74	7	295	1	610 000	1 516 000	0.065 – 0.165	100
80	85	6	332.5	1	655 000	2 340 000	0.065 – 0.165	110
90	95	6	390	1	950 000	3 510 000	0.065 – 0.165	120

## Spherical Plain Bearings & Rod Ends

### Hydraulic Rod Ends

Metric(requiring maintenance)



**Technical Parameters:**

Shaft diameter d mm	Bearing Code	Mass kg	Dimensions							
			d	D	B	dk	d1	d2	d6	h2
10	GK 10 DO <sup>1)</sup>	0.041	10–0.008	19	9–0.12	16	13.2	29	15	24
12	GK 12 DO <sup>1)</sup>	0.066	12–0.008	22	10–0.12	18	14.9	34	17.5	27
15	GK 15 DO <sup>2)</sup>	0.12	15–0.008	26	12–0.12	22	18.4	40	21	31
17	GK 17 DO <sup>2)</sup>	0.19	17–0.008	30	14–0.12	25	20.7	46	24	35
20	GK 20 DO <sup>2)</sup>	0.23	20–0.01	35	16–0.12	29	24.1	53	27.5	38
25	GK 25 DO	0.43	25–0.01	42	20–0.12	35.5	29.3	64	33.5	45
30	GK 30 DO	0.64	30–0.01	47	22–0.12	40.7	34.2	73	40	51
35	GK 35 DO	0.96	35–0.012	55	25–0.12	47	39.7	82	47	61
40	GK 40 DO	1.3	40–0.012	62	28–0.12	53	45	92	52	69
45	GK 45 DO	1.8	45–0.012	68	32–0.12	60	50.7	102	58	77
50	GK 50 DO	2.5	50–0.012	75	35–0.12	66	55.9	112	62	88
60	GK 60 DO	3.9	60–0.015	90	44–0.15	80	66.8	135	70	100
70	GK 70 DO	6.6	70–0.015	105	490.15	92	77.8	160	80	115
80	GK 80 DO	8.7	80–0.015	120	55–0.15	105	89.4	180	95	141

**Remarks:**

- 1) No relubrication facility.
- 2) Relubrication via lubrication hole in housing.
- 3) Basic load rating of housing.
- 4) Deviating from ISO 12 240–4.
- 5) Type GF...DO is made up of a spherical plain bearing of type GE...DO and housing with a rectangle welding face.
- 6) We can manufacture a spherical plain bearing with two seals and rod body, e.g. GK70DO-2RS

## Material

Drop forged construction steel, surfaces preserved.

Sliding contact surface: Steel/steel

C <sub>1</sub>	α	Dimensions				Chamfer dimensions r <sub>1s</sub>	Basic Load Rating		Radial internal clearance <sup>4)</sup> CN	Shaft diameter d
		l <sub>6</sub>	l <sub>7</sub>	l <sub>8</sub>	d <sub>7</sub>		dyn Cr	stat. Cor <sup>3)</sup>		
mm	degrees	mm				min	N			mm
7	12	38.5	15	2	3	0.3	8 150	15 600	0.023 – 0.068	10
8	11	44	18	2	3	0.3	10 800	21 500	0.023 – 0.068	12
10	8	51	20	2.5	4	0.3	17 000	31 800	0.030 – 0.082	15
11	10	58	23	3	4	0.3	21 200	40 100	0.030 – 0.082	17
13	9	64.5	27	3	4	0.3	30 000	52 400	0.030 – 0.082	20
17	7	77	32	4	4	0.6	48 000	70 800	0.037 – 0.1	25
19	6	87.5	37	4	4	0.6	62 000	95 600	0.037 – 0.1	30
21	6	102	42	4	4	0.6	80 000	127 000	0.037 – 0.1	35
23	7	115	48	5	4	0.6	100 000	155 000	0.043 – 0.12	40
27	7	128	52	5	6	0.6	127 000	208 000	0.043 – 0.12	45
30	6	144	60	6	6	0.6	156 000	251 000	0.043 – 0.12	50
38	6	167.5	75	8	6	1	245 000	389 000	0.043 – 0.12	60
42	6	195	87	10	6	1	315 000	510 000	0.055 – 0.142	70
47	6	231	100	10	6	1	400 000	624 000	0.055 – 0.142	80